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Except as indicated, abstracts are by William H. Stickel, editor.

NATURAL RESOURCES & CLIMATE

Blatnik, John A. (US House Representatives, Wash., D. C.) WATER POLLUTION--THE SHAME OF AMERICA. Trans. 23d N. Am. Wildl. Conf.: 98-108. 1958.

Clawson, Marion. (Resources for the Future, 1145 19th St. NW., Wash. 6, D. C.) THE CRISIS IN OUTDOOR RECREATION. Am. For. 65(3): 22-31, 40-41, 26 figs. Mar. 1959.

Major article on the growing pressures on our recreational areas. Clawson shows what can be done with available figures, and tells what new data are especially needed to judge the coming crisis closely. According to the best estimates he can make now, by the year 2,000 (only 41 years away) the pressures on local playgrounds and parks will be 4 times as great as in 1950. For intermediate areas, such as fishing and picnicking areas that are about 2 hours away from population centers, pressures will be about 16 times as great as in 1950. But for the resource-based areas of scenic importance, pressures may be 40 times as great as in 1950. These estimates are startling, but previous estimates have proved too low. Many questions suggested by the estimates will be examined in a following article.

Clawson, Marion. (Resources for the Future, 1145 19th St. NW., Wash. 6, D. C.) STATISTICAL DATA AVAILABLE FOR ECONOMIC RESEARCH ON CERTAIN TYPES OF RECREATION. J. Am. Stat. Assn. 54(285): 281-309. Mar. 1959.

Very little on hunting and fishing, but the general context should be of value to wildlife and fisheries biologists interested in the subject of recreation.--V. Schultz.

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) SCIENCE AND RESOURCES IN AMERICA. Trans. 23d N. Am. Wildl. Conf.: 45-55. 1958.

America is devouring and destroying its resource base at a dangerous rate. To correct this, "1. We must cease and desist from our past wasteful extravagances and live within our resource income. 2. We must give effective support to both basic and applied scientific research as it relates to our natural resources and particularly to our renewable resources." All of these points are discussed and examples are cited.

Dasmann, Raymond F. (Humboldt State Coll., Arcata, Calif.) ENVIRONMENTAL CONSERVATION. John Wiley & Sons, 440 4th Ave., N. Y. 16, N. Y. x + 307 p., 153 figs. 1959. $6.50.

The history and ecology of man are the focus for the principles of conservation that are graphically portrayed in this book. Renewable resources--land, water, forests, rangeland, wildlife, and fisheries--receive primary emphasis. Other chapters include a discussion of the major biotic regions of the earth and the history of man on the earth. The book closes with 3 integrating chapters: conservation of environments, the problem of population, and the outlook. The central theme is carried forward in each chapter through interestingly told history and example. Well-chosen photographs and drawings enhance the story. The content is well-suited to a one-semester undergraduate course in conservation for which the book is intended. It is not written as a text, however. Instead of definitions and categories to be memorized, there is a well-told story that makes the subject and the problem real.--L. F. Stickel.

Gabrielson, Ira N. (Wildl. Mgt. Inst., Wire Bldg., Wash. 5, D. C.) THE BLIGHT OF POLITICS, OR CONSERVATION BE DAMNED! Trans. 23d N. Am. Wildl. Conf.: 90-97. 1958.

Happ, George B. (Principia Coll., Elsah, Ill.) RESOURCE MANAGEMENT AND HUMAN ECOLOGY. Trans. 23d N. Am. Wildl. Conf.: 514-524, 1 fig. 1958.

Jarrett, Henry, editor. PERSPECTIVES ON CONSERVATION: ESSAYS ON AMERICA'S NATURAL RESOURCES. Johns Hopkins Press, Balt. 18, Md. xii + 260 p. 1958. $5.00. [From review in Outdoor News Bul. 13(2).]

"The main purpose of this book, the editor writes, 'Is to examine the record of the past 50 years for the lessons that may contribute to the understanding and solution of present resource problems and those of the next 50 years.' The essays, first presented as lectures at the 1958 Resources for the Future Forum, deal with some of the natural resources developments and problems that have

proved to be of continuing significance since the 1908 Governor's Conference called by Theodore Roosevelt. That historic meeting generally is credited as the point from which the national conservation concept and conscience emanated. More general than specific, the essays nevertheless should provide stimulating reading for all persons interested in the general philosophy of conservation and natural resource management. Included among the distinguished essayists are Ernest C. Griffith, former director of the Legislative Reference Service, Library of Congress; Samuel T. Dana, dean emeritus of the School of Natural Resources, University of Michigan; Henry C. Hart, associate professor of political science, University of Wisconsin; Thomas B. Nolan, director, U. S. Geological Survey; Robert C. Cook, director, Population Reference Bureau; Harry A. Curtis, former director, TVA; John Kenneth Galbraith, professor of economics, Harvard University; Paul B. Sears, chairman, Yale University's Conservation program; and Abel Wolman, professor of sanitary engineering, Johns Hopkins University."

Lovelace, Eldridge. (Harland Bartholomew Associates, St. Louis, Mo.) CONSERVATION IN URBAN DEVELOPMENT. Trans. 23d N. Am. Wildl. Conf.: 34-41. 1958.

"Urban development of the future should tend to more and more fit itself into, if not disappear into the natural landscape." Among the necessary tools are planning, zoning, and public purchase of development rights to keep open areas.

Mills, Harlow B. (Ill. Nat. Hist. Surv., Urbana.) STANDING ROOM ONLY--2000 A. D. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 58-67. 1958.

Malthus ably brought up to date and applied to present and coming problems of the U. S.

Olson, Sigurd F. (Box 157, Ely, Minn.) OUR PUBLIC LANDS: SHALL THE PUBLIC ABDICATE CONTROL? Trans. 23d N. Am. Wildl. Conf.: 116-132. 1958.

The basic philosophy behind federal ownership is that only the government can give continuity and stability to natural resource management on our remaining public lands. Only the federal government can afford to operate on the long-term, non-profit basis necessary for proper conservation of scenery, recreation, soil, grasslands, minerals, wildlife, or timber. Private owners cannot be concerned about intangible values or services in the broadest public interest. In view of our swiftly expanding population and industrial complex, the question is not whether we shall keep our public lands but how we can enlarge them to provide a sane balance between urban development and the out of doors. Unless we have the courage and vision to meet growing recreational needs by providing greatly expanded opportunities, we may well lose what Americans prize highly in their heritage--a perspective born of space and freedom. Our public lands have demonstrated their worth. Today they are pouring more revenue into the national treasury than Congress appropriates for their needs. These lands are a reserve against the future, an investment trust that should be drawn upon only for those purposes that give stability to our economy. No individual can feel secure without a backlog of resources both material and spiritual. No nation can feel secure without similar reserves. Our public lands provide both.--Author.

Peterson, Melvin J. (Probate Judge, Hennepin Co., Minn.) THE LAWS OF THE WATERSHED. Cons. Volunteer 22(127): 1-8, map. Jan.-Feb. 1959.

History of watershed problems and legislation in Minn. is reviewed. Most significant event was passage of Minn. Watershed Act of 1955 and 1957, which provides for the organization of watershed districts as a form of local political organization; these groups can qualify for assistance under Federal Act PL 566. A Watershed District thus organized has adequate power and authority to carry on all the practices embraced in a complete watershed program, including promotion of fish, game, and recreational interests. It can deal with various federal and state agencies that promote diverse and conflicting interests. Through it, there is hope that competition and acrimony may be reduced and that all water problems of an area can be handled in the best way, with proper consideration for drainage, reclamation, irrigation, water storage, conservation for agricultural, domestic, industrial, and recreational purposes, sanitation and public health, soil erosion and siltation control, wildlife, and forestry.--L. F. Stickel.

Stout, Ed. (Bowaters S. Paper Corp., Calhoun, Tenn.) TODAY'S OPPORTUNITIES FOR CONSERVATION IN INDUSTRIAL DEVELOPMENTS. Trans. 23d N. Am. Wildl. Conf.: 28-32. 1958.

Towell, Wm. E. (Mo. Cons. Comm.) NATURAL RESOURCES GOING OUT THE WINDOW. Trans. 23d N. Am. Wildl. Conf.: 109-115. 1958.

There is loss, waste and destruction in many of our uses of natural resources. Together, these mean loss of the freedoms, progress and prosperity that depend on natural resources, wisely used. Conservation is the only force opposing destruction, but even in legitimate conservation projects we sometimes open the door to one kind of waste while closing the window to another. To avoid this, conservation must consider the long haul as well as immediate gain; the whole complex of natural resources and human use, instead of just the individual project. Currently, soil and water are going out the window because of wasteful use, abuse, and inadequate protection. Forest resources are constantly threatened by overuse, conflicting uses, fire. insects and disease. Controls of most of these are inadequate. Fish, game, and recreational values are constantly threatened by conflicting uses and by abuses of soil, water and timber. The most important resource of all, which we cannot afford to let go out the window, is the organized effort of conservation to preserve our natural resources. This is threatened by complacency, false values, inadequate information for immediate and long-range management, and lack of public understanding and support.--Author.

Various authors. WATER RESOURCES AND THE LAW. U. Mich. Law Sch., Ann Arbor. 614 p. 1958. $5.00, paper. [From J. Soil & Water Cons. 14(2).]

"This volume combines the written contributions prepared for the Tenth Annual Summer Institute of the Michigan Law School held in September, 1957, eleven monographs, and the Model Water Use Act prepared by staff members of the Law School Legislative Research Center. A wide range of subject matter representative of the views of both the engineering and legal professions is covered. An appendix includes the Mississippi Conservation and Development of Water Resources Act and the Iowa Natural Resources Act which is concerned with water."

SOILS

Caldwell, R. E., and others. SOIL SURVEY OF MANATEE COUNTY, FLORIDA. US Soil Cons. Serv., Ser. 1947, no. 8. i + 37 p., 1 fig., + single-fold maps based on aerial photos and bound in. Dec. 1958. Sold by Supt. Documents.

Cline, A. J., and others. SOIL SURVEY OF SALINE COUNTY, KANSAS. US Soil Cons. Serv., Ser. 1950, no. 4. vi + 175 p., illus. + large folding maps. Jan. 1959. Sold by Supt. Documents.

McConnell, R. C., and others. SOIL SURVEY OF WIBAUX COUNTY, MONTANA. US Soil Cons. Serv., Ser. 1943, no. 1. ii + 44 p., illus. + large single-fold maps based on aerial photos and bound in. Dec. 1958. Sold by Supt. Documents.

Petro, James H., and others. SOIL SURVEY OF CLARK COUNTY, OHIO. US Soil Cons. Serv., Ser. 1949, no. 1. 1-139 p., 2 figs. + large, folding colored maps. July 1958. Sold by Supt. Documents.

Rogers, G. E., and others. SOIL SURVEY OF BOLIVAR COUNTY, MISSISSIPPI. US Soil Cons. Serv., Ser. 1951, no. 5. ii + 42 p., 2 figs. + large single-fold maps based on aerial photos and bound in. Dec. 1958. Sold by Supt. Documents.

CONSERVATION EDUCATION

Foster, George. (4-H Club Devel. Comm. on Cons. Nat. Resources, Knoxville, Tenn.) 4-H CLUBS PRACTICE RESOURCE MANAGEMENT. Trans. 23d N. Am. Wildl. Conf.: 66-75. 1958.

Heistand, Charles M. (Boy Scouts of Am., New Brunswick, N. J.) BOY SCOUTS AS CONSERVATIONISTS. Trans. 23d N. Am. Wildl. Conf.: 56-64. 1958.
Tells how conservation is worked into the scout program, and tells of many conservation achievements by scouts.

Litton, Jerry. (Future Farmers of Am., Chillicothe, Mo.) FUTURE FARMERS LEARN CONSERVATION. Trans. 23d N. Am. Wildl. Conf.: 76-79. 1958.

Lively, Charles E. (U. Mo., Columbia.) WHITHER EDUCATION IN AMERICAN COLLEGES? Trans. 23d N. Am. Wildl. Conf.: 576-583. 1958.
Based upon questionnaire returns from 1024 colleges and universities, with fewer than 7000 students, in nation-wide survey, 1954. Larger universities were covered by study of catalogs. Both administrators and conservation teachers were questioned, the former concerning status and outlook for conservation education, the latter concerning courses taught, conservation philosophy, to whom the subject should be taught, how to make the teaching effective. Analysis is made of geographic and institutional factors related to the incidence of conservation teaching. Also, the best teaching programs are contrasted with the poorest, and are related to characteristics of institutions offering them. Conservation is not generally taught. Courses tend to be technically oriented. Student exposure is definitely limited. Teacher evaluation of programs was more critical than that of administrators. Privately supported institutions lag behind publicly supported ones. Dissatisfaction suggests that an action program to stimulate improvement might achieve considerable success. General responsibility of the people for conservation in a democracy is stressed, and their involvement is indicated in terms of 7 tasks that must be performed if conservation is to be practiced.--Author.

Messner, Clarence John. THE DEVELOPMENT AND TRY-OUT OF A SET OF CRITERIA FOR THE EVALUATION AND IMPROVEMENT OF A CONSERVATION EDUCATION PROGRAM IN AN ELEMENTARY SCHOOL. Ph.D. thesis, U. Mich. 192 p. 1958. [From abstract in Dissertation Abstracts 19(8).]

Taylor, Walter P. (424 Harrison Ave., Claremont, Calif.) CONSERVATION EDUCATION IN AUSTRALIA AND NEW ZEALAND. Trans. 23d N. Am. Wildl. Conf.: 533-551. 1958.
With its 2,000 million acres, its coast line of 12,210 miles, its southern location, and its isolation, Australia is biologically one of the most interesting land areas on earth. The island continent was early furnished with primitive mammalian stocks, then isolated, so that "Australian marsupials are the best existing example of evolutionary or adaptive radiation in an isolated place." The entry of the white man, with his introduced mammals, especially the fox, cat, rat and rabbit, has already brought about the extinction of many native forms and imperilled others. New Zealand, which is about the size of California, is a country of high mountains and deeply dissected hill land. The New Zealand group of islands has been cut off from southeastern Asia for a much longer time than Australia, if, indeed, it has ever been connected. Its only native mammals are a couple of inconspicuous bats. More than 50 exotic mammals have been introduced, some with rather unfortunate consequences. New Zealand has 8 national parks, which occupy nearly 6 percent of the area of the country, as compared with our own national parks in the United States which make up less than 1 percent of our territory. Conservation educational efforts, both in Australia and New Zealand, include the work of the public schools, Government departments, scientific institutions, and a number of associations, public and private. It is felt that an expanded interchange of persons, from Australia and New Zealand to the United States in one direction, and from our own country to Australia and New Zealand, in the other, would be wonderfully fruitful.--Author.

Tippo, Oswald. (Yale U., New Haven, Conn.) EDUCATION FOR FUTURE BIOLOGICAL SCIENTISTS. Trans. 23d N. Am. Wildl. Conf.: 80-88. 1958.

Various authors. CONSERVATION AND RESOURCE-USE EDUCATION. Joint Council on Economic Education, 2 W. 46th St., N. Y. 36, N. Y. 234 p. [1958?] $2.50. [From J. Soil & Water Cons. 14(2).]

"This is a processed report of a workshop involving representatives of nine school systems participating in the Joint Council's project 'CRUE' (Conservation and Resource-Use Education). The workshop, with 58 persons from 24 states was held July 8-17, 1957, at Antioch College. Included in the report are the background speeches, discussions, and summaries of 'representative experiences in conservation and resource-use education' at elementary, junior high, and high school levels. Several committee reports are included, with one on a 'proposal for developing resource-use education through the establishment of collegiate centers.' Summaries were made by Joseph L. Fisher of Resources for the Future (a grant from RFF has made CRUE possible) and George L. Fersh, director of CRUE for the Joint Council. A valuable report." The volume has a bibliography.

Vessell, Mathew F., and Arnold G. Applegarth. EXPERIENCES WITH LIVING THINGS. Fearon Publishers, San Francisco, Calif. 195 p., illus. 1957. $3.50, paper. [From review by W. A. Evans, Calif. Fish & Game 45(1).]

A guide for training teachers and youth leaders in the interpretation of everyday natural history. It is especially designed for use in Calif. Part I deals with various types of field trips. Part II suggests activities related to materials students saw on field trips or brought back. Part III consists of keys to common plants and animals of Calif. References are cited for more detailed work. "All in all, this is the best guide for aiding teachers or laymen in the interpretation of local natural history that has come to the reviewer's attention to date. For its successful employment, a limited background in natural science will suffice."

Weaver, Richard L. (U. Mich., Ann Arbor.) THE NATURE AND EXTENT OF LEADERSHIP IN CONSERVATION EDUCATION IN STATE AGENCIES 1956-1958. U. Mich., Dept. Cons., Sch. Nat. Resources. ii + 65 p., 1 map. 1958. Available on request.

The author studied conservation education activities of state education and resource depts. by means of questionnaires and personal visits. Here he reports just what each state is doing and how it is going about it: what system is used, what materials are made available, what type of interagency cooperation exists, where stimuli and finances for programs come from. Some conclusions are: State depts. of education seldom go in for conservation programs unless financed by resource agencies or pressured from outside. Best results come where education dept. has a full-time conservation consultant financed from dept's. own funds. But where education dept. has no conservation person and the resource agency is strong, personnel might well be detailed to education dept. Where conservation dept. works directly in education, best results come from working with teachers rather than with children. Education depts. do not like to be forced into conservation by legislature. Such pressure must stem from lay groups. Legislative action in this field does no harm, but is not necessary, except for provision of funds. Interagency committees for conservation education are valuable and should be encouraged. Provision of bulletins, guides, and audio-visual aids is very important for success. Wisconsin's guide is outstanding, as is its whole program. The whole state program in conservation education should be directed at teachers and adult leaders. In this way a given amount of effort and money can be multiplied geometrically. It is wasteful to try to work directly with children--leave that to the teachers. There should be training programs for teachers, both pre-service and in-service. All agencies and groups should cooperate to make services and materials available.

White, Paul A. (Nichols Jr. Coll., Dudley, Mass.) JUNIOR COLLEGES WORK IN CONSERVATION EDUCATION, TOO! Trans. 23d N. Am. Wildl. Conf.: 552-559. 1958.

How the Nichols Junior College handles its successful curriculum in forestry and wildlife management. One important feature is that each student gets training in business procedures and business mathematics as well as courses and field experience in biological fields.

BIBLIOGRAPHIES, DIRECTORIES, BIOGRAPHY, HISTORY

Aller, Barbara B., compiler. PUBLICATIONS OF THE UNITED STATES BUREAU OF FISHERIES 1871-1940. US F&WS, Spec. Sci. Rep.--Fisheries no. 284. iii + 202 p. Dec. 1958.

Lists all titles in the following series: Documents, Economic Circulars, Administrative Reports, Bulletins, Investigational Reports, and Fishery Circulars. These titles are indexed at length, p. 126-202. Note that this publication lists no titles later than 1940, when the Bureau of Fisheries was merged into the Fish & Wildlife Service.

Garst, Shannon, and Warren Garst. ERNEST THOMPSON SETON--NATURALIST. Julian Messner, Inc., 8 W. 40th St., N. Y. 18, N. Y. 1-192 p. 1959. $2.95, cloth.

Few of us realize Seton's full greatness and versatile talents. He provided much of the body of Am. mammalogy and basic wildlife biology, was author of references that are still standard, introducer of the home-range concept, father of the Peterson type of bird identification, a student of tracks and signs, an accomplished professional artist, a skilled writer, a dedicated and inspired field man who took many volumes of detailed notes, founder of the Boy Scouts, and a highly successful popular writer and lecturer who made a fortune at an early age. A showman, perhaps, but certainly an inspired and devoted naturalist and a demon worker. The Garsts have written this absorbing account of his life for young people and have therefore devoted most attention to his early years. We find the book satisfactory for adult reading, however, and feel that it gives a real insight into Seton's character, background, and motivations. Readers who want more detail are referred to Seton's autobiography, which the Garsts freely credit as a source. They also list Seton's other publications and publications about Seton, and they supply a subject index, both of which are unusual in popular works for young people. A few simple illustrations would have been welcome; some of Seton's own drawings could have been reproduced at little cost.

Mills, Harlow B., and others. A CENTURY OF BIOLOGICAL RESEARCH. Ill. Nat. Hist. Surv., Bul. 27(2): 85-234 p., illus. Dec. 1958.

The Ill. Nat. Hist. Survey completed its first 100 years in 1958 and marked the centennial with this informative volume. The origin, evolution, adaptive radiation, and functions of the Survey are detailed. Each line of activity has its own chapter, written by a specialist. Chapters pertain to general history of Survey, economic entomology, faunistic surveys, applied botany and plant pathology, aquatic biology, wildlife research, publications, and library. Wildlife Research, by Thomas G. Scott, traces the history of this work in the Survey and describes contributions made to the study of non-game birds, prairie chicken, bobwhite, pheasant, Canada goose, ducks, mourning doves, fur animals, game mammals, and habitat management. Scott's account shows how much the Survey has accomplished, and it also puts the work in perspective. We see how little concern anyone seemed to have around the turn of the century with preservation of sample natural areas; everyone considered exploitation of all land to be right and inevitable. Today exploitation is increasingly intensive; the game biologist of the future will have to cope with ever-greater difficulties and more and more artificialization of hunting and of the out-of-doors as a whole.

Salt, W. Ray. IN MEMORIAM: WILLIAM ROWAN. Auk 75(4): 387-390, 1 pl. Oct. 1958.

Includes portrait and selected bibliography.

Scheuermann, Wm. F., Jr. AN ANNOTATED BIBLIOGRAPHY OF RESEARCH IN ECONOMICALLY IMPORTANT SPECIES OF CALIFORNIA FISH AND GAME. Calif. Legislature, Assembly Interim Committee Reports 5(5): 1-271 p. Aug. 1958.

A formal, well-printed bibliography. Arrangement is by species or group. Pages 11-195 deal with fishes, both marine and fresh-water. Pages 197-267 are on birds and mammals. Only species of commercial or sporting importance are considered. Rodent pests are not included, but hares, rabbits, and tree squirrels are. Entries are essentially limited to those dealing specifically with Calif. That is, papers on puma in Calif. are listed, but not general monographs on the puma. Each title is annotated to provide good indication of subjects covered. The volume has an index.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Cooper, Arthur Wells. PLANT LIFE-FORMS AS INDICATORS OF MICROCLIMATE (VOLUMES I AND II). Ph.D. thesis, U. Mich. 556 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

Shanks, Royal E. (U. Tenn., Knoxville.) FLORISTIC REGIONS OF TENNESSEE. J. Tenn. Acad. Sci. 33(3): 195-210. July 1958.

Mass ranges of groups of woody species provide a basis for establishing floristic regions for the state of Tennessee. The boundaries of these regions generally correspond with physiographic boundaries, but a good many species occur in more than one province. Recognition is floristically warranted for sub-regions not shown on ordinary physiographic maps: the bluffs above the Mississippi Alluvial Plain, the coastal plain uplands at the eastern edge of the Mississippi Embayment, the barrens of various parts of the Highland Rim, the cedar glades of the Central Basin, and the oak-pine region at the southern end of the Appalachian Valley.--Auth. summ.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Anon. DESCRIPTION OF VEGETATION COVER TYPES OF THE AMERICAN MUSEUM OF NATURAL HISTORY FIELD STATION AND WILDLIFE SANCTUARY, HUNTINGTON, NEW YORK. A SUPPLEMENT TO THE VEGETATION COVER MAP, PROVIDING A GENERAL ACCOUNT OF THE STRUCTURE, COMPOSITION AND HISTORY OF THE VEGETATION UNITS AS MAPPED. ADAPTED FROM AN INITIAL INVENTORY MADE BY W. E. MARTIN MAY, 1958. Am. Mus. Nat. Hist., N. Y. 24, N. Y. 28 p., mimeo. No date [1958?].

A detailed floristic and vegetational survey of a 94-acre tract in Suffolk Co., Long Is. The map referred to is on a separate photostat sheet.

Britton, Max E. (Geography Branch, Office Naval Res., Wash. 25, D. C.) VEGETATION OF THE ARCTIC TUNDRA. p. 26-61, 12 figs., in Arctic Biology, Biology Colloquium 1957. Ore State Coll., Corvallis. 1957.

Good report on topography, soils, plant communities, and physical factors at work in n. Alaska.

Ehrle, Elwood B. THE FLORA OF CLEARFIELD COUNTY, PENNSYLVANIA. Ph.D. thesis, Pa. State U. 190 p. 1958. [From abstract in Dissertation Abstracts 19(6).]

The annotated catalog of 945 forms of vascular plants is supplemented by a review and analysis of the probable history of the flora and a discussion of the effects of man's activities. Habitat types and the communities they support are discussed and characterized.

Humphrey, R. R. (U. Ariz., Tucson.) ARIZONA RANGE GRASSES. Ariz. Agr. Exp. Sta. Bul. 298. 104 p. July 1958. No price stated. [From J. Range Mgt. 12(1).]

Martin, Wm. E. THE VEGETATION OF ISLAND BEACH STATE PARK, NEW JERSEY. Ph.D. thesis, Rutgers U. 239 p. 1958. [From abstract in Dissertation Abstracts 19(6).]

Ecological analysis of plant communities on a 10-mile stretch of barrier beach. Strongest influence in development of the plant communities and vegetational zones is the topography, which acts mainly through its influence on sand movement, soil salinity, available soil moisture, and windborne salt spray.

Martin, Wm. E. (U. Minn., Minneapolis 14.) THE VEGETATION OF ISLAND BEACH STATE PARK, NEW JERSEY. Ecol. Monog. 29(1): 1-46, 19 figs. Jan. 1959.

Detailed description and ecological analysis of a nearly natural seaside area of diversified vegetation.

Shields, Arthur Glenn. THE FLORA OF FOREST COUNTY, PENNSYLVANIA. Ed.D. thesis, Pa. State U. 95 p. 1958. [From abstract in Dissertation Abstracts 19(6).]

Results of a 10-year systematic field survey of vascular plants. Distribution maps were prepared for 806 forms. A significant number of plants of generally southern distribution were found to reach their northern limits in the county.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY--Continued

Sigafoos, Robert S. VEGETATION OF NORTHWESTERN NORTH AMERICA, AS AN AID IN INTERPRETATION OF GEOLOGIC DATA. US Geol. Surv. Bul. 1061-E. iii + 165-185 p., 5 photos, 13 text maps, 1 large, folding, colored map in end-pocket. 1958. 75¢ from Supt. Documents.

"A distribution map of the major forest groups of northwestern North America and some treeless vegetation types of parts of Alaska has been prepared from published large-scale maps and data collected during recent field studies by the U. S. Geological Survey. The most common plant communities in the interior spruce and birch forest, coastal spruce and hemlock forest, and treeless regions are briefly described. Engelmann spruce and lodgepole pine grow in the extreme southeastern part of the region mapped. Examples are cited to demonstrate the importance of a knowledge of vegetation in aiding in interpretation of local distribution of permafrost, and the significance of upper Pleistocene and recent fossil plants, and as a part of background material for future ecologic, geomorphologic, and hydrologic studies. The usefulness of accurate knowledge of the geographic distribution of various species is discussed and maps of the principal tree species are included."--Auth. abst.

Skau, C. M., and M. W. Day. (Mich. State U., E. Lansing.) AN ECOLOGICAL STUDY OF A MAN-MADE ISLAND. Am. Midl. Nat. 61(1): 109-123, 4 figs. Jan. 1959.

Five-acre Ecology Island was formed in 1932 by dredging of the St. Mary's River at the e. end of the Upper Peninsula of Mich. This paper reports on plant invasion and succession. The fertile calcareous soil was favorable for plants and good seed source was available nearby. Invasion was rapid and changes have come fast. Already 2 spp. of Populus dominate part of the island, but the climax maple-birch-beech has not yet appeared. Many kinds of perennial forbs are fighting for supremacy where Populus has not taken over.

PLANTS--FOREST SURVEYS

Anon. TIMBER IN NORTH CAROLINA. US Dept. Agr., For. Resource Rep. no. 15. 24 p., illus. Jan. 1959.

Informative, popular, pictorial presentation. Conclusions: "The short-term timber supply outlook in North Carolina is quite favorable. Present growth is more than sufficient to replace the cut for all classes of timber except some types of highest quality. The long-term outlook is not so favorable, especially if the strong preference for pine sawtimber continues. Just to maintain the present rate of pine regeneration will require substantial increases in planting and in hardwood control. If forestry efforts are greatly intensified, North Carolina has the opportunity to greatly increase its pine sawtimber growth during the next 50 years. The big job is to make it possible for the State's more than 200,000 farmers, who own 70 percent of the forest land, to practice better forestry."

Cunningham, R. N., A. G. Horn, and D. N. Quinney. MINNESOTA'S FOREST RESOURCES. US Dept. Agr., For. Resource Rep. no. 13. iii + 52 p., 49 figs. + colored map of major forest types. Oct. 1958. 55¢ from Supt. Documents.

An interesting but detailed account of history of Minn. forests, timber volumes and types, annual growth, allowable cut, present cut, forest industries, trends in timber utilization, problems created by overcutting some types and undercutting others, trends and problems under different ownerships, and management needs. Comparisons are made with conditions in 1936. In general, conditions have been improving since that time and the future of forest production in Minn. should be bright. More planting of softwoods is needed and more outlets for low-grade hardwood. Public lands need more access roads. Many small private holdings are overcut, badly cut, or unmanaged.

Ferguson, Roland H. THE TIMBER RESOURCES OF PENNSYLVANIA. US For. Serv., NE For. Exp. Sta., Upper Darby, Pa. ii + 46 p., illus. 1958.

"The survey data show--as of January 1, 1955--the area and condition of the forest land, and the volume and quality of the standing timber. They also include, for the year 1954, estimates of timber growth and mortality, and estimates of timber cut for forest products."

WILDLIFE--NEW JOURNALS

TECHNICAL TRANSLATIONS. Published twice a month by U. S. Dept. Commerce, Office of Technical Services, Wash. 25, D. C. Vol. 1, no. 1, 58 p., Jan. 2, 1959. Subscription $12 a year in U. S., $4 extra for foreign mailing. Make check payable to OTS, U. S. Dept. Commerce.

This is the key reference for those interested in English translations of foreign language papers and abstracts, especially from the Soviet bloc. It lists, usually with abstract, all known translations regardless of their source or deposition and tells where to order them and how much they cost. Among the items listed are each translated section of the Russian equivalent of Biological Abstracts, "Soviet Abstracts, Biology." One thus can keep track of what sections of Sov. Abst. are being translated and issued, and order the sections desired. So far we have found few titles of wildlife management nature in either Tech. Transl. or Sov. Abst., although many papers of this type are produced in Russia. On the other hand, much material is being translated in such cognate fields as zooparasitology, toxicology, virology, morphology, and physiology.

WILDLIFE DISEASE. Published quarterly by Wildlife Disease Association, Am. Inst. Biol. Sci., 2000 P St. NW., Wash. 6, D. C. Published by Microcard. Numbers 1 and 2, each 1 Microcard, were issued Feb. 1959 for Jan. 1959 with 4-p. leaflet that provides abstracts of the 2 articles and general information about journal and Association. $1.00 a year.

A great experiment with a radically new method of publishing a journal. Two 3 x 5 in. cards carry two articles, each 38 p. long. They can be read with special readers or with binocular dissecting 'scope. The format offers great saving of space, easy filing, ready publication of long papers, and unlimited use of illustrations or tables. You can file the whole paper instead of an index card for it. Extra supply of a paper can be ordered at any time at small cost. Each article has a number and this number will be used in citations as if it were a volume number. Abstracts of numbers 1 and 2 are given in a 4-p. leaflet that can be read without magnification. The new format seems best adapted to long articles of reference type, such as those that have many lists, tables, graphs, etc., and less well adapted to short articles (which would waste most of the card) or to articles intended for thorough reading by many people. Articles 1 and 2 are: Check-list of blood parasites of birds of the Order Columbiformes, by N. D. Levine and S. Kantor; and Control of population growth in rodents by interplay between population density and endocrine physiology, by John J. Christian.

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Balogh, J. LEBENSGEMEINSCHAFTEN DER LANDTIERE. Hungarian Acad. Sci., Budapest. 1-560 p. 1958. [From review by S. C. Kendeigh, Auk 75(4).]

"This textbook of ecology with particular reference to terrestrial animals emphasizes the community point-of-view. There is an analysis of the internal structure and dynamics of the community, succession, and classification of different types. Concepts of dominance and productivity are given special attention. Nearly half of the book is concerned, however, with methods of collecting and measuring invertebrate animal populations. It is here that the author makes his greatest contribution. The section on birds and mammals is written by F. J. Turcek of Czechoslovakia. Berndt Heydemann prepared a section on methods of studying communities in man-made habitats. Some 800 citations of literature are listed, approximately equally divided between German and English with a scattering of other languages."

Hansen, Henry P., editor. ARCTIC BIOLOGY. Biol. Colloquium, 1957. Ore. State Coll. Chapter of Phi Kappa Phi, Corvallis. 134 p., illus. 1957. $2.50, paper.

A well printed volume of authoritative review and research papers that pertain chiefly to Alaska. Papers are: The Arctic--its discovery and past development, by Ira L. Wiggins. Permafrost and its effect on life in the North, by Troy L. Péwé. Vegetation of the arctic tundra, by Max E. Britton. Pleistocene and postglacial vegetation of Alaska and the Yukon Territory, by Calvin J. Heusser. Some characteristics of microtine cycles in the Arctic, by Frank A.

Pitelka [see review this issue WR]. Wildlife in arctic and subarctic Alaska, by John L. Buckley [see review in WR 94]. Arctic and subarctic agriculture, by Allan H. Mick. Health and sanitation problems in the Arctic, by Amos J. Alter. American arctic populations: their survival problems, by Margaret L. Lantis. Potentialities for the future of the American Arctic, by Ira L. Wiggins.

Koenig, Lilli. NATURE STORIES FROM THE VIENNA WOODS. T. Y. Crowell Co., 432 4th Ave., N. Y. 16, N. Y. 159 p., numerous text drawings + 24 photos. 1958. $3.50, cloth. Transl. by Marjorie Latzke from "Die Klaren Augen," 1951.

Popular, readable account of some of the studies and observations of animals that have been made at a research station for animal behavior located on the outskirts of Vienna. The authoress plainly loves animals as few people do. She devotes her life to their care and study--except for the time that has to be spent on technical reports and on writing and lecturing to raise money to live. Animals are kept as pets, indoors and out, often with the freedom of the station, so their reactions can be observed under relaxed, semi-natural conditions. The most detailed stories are about turkey, kestrel, bee-eaters, dormouse, badger, hare, nutria, gray squirrel, and roe deer. There are many interesting observations and some surprising ones; all gain in interest from the knowledge that they are authentic. Konrad Lorenz contributed the introduction.--L. F. Stickel.

Stebler, A. M., and Sanford D. Schemnitz. (Okla. State U., Stillwater.) HABITAT DESCRIPTION AND THE LIFE-FORM CONCEPT. Proc. Okla. Acad. Sci. 36: 154-157. 1955 [1956?].

Suggests that we should classify the habitat of an animal not by kind of vegetation but by physical nature of niche. "It seems plain from these data that in western Oklahoma, the scaled quail favors habitat niches constituting the shrub life-form and also certain kinds of artifacts as found usually about farmsteads. Combined these habitat situations or niches may be regarded as comprising the regional habitat of this quail. It is suggested, moreover, that it is the general occurrence of one or more of these throughout the three major regional vegetal types that furnished suitable habitat to this quail. Habitat niches, thus viewed, become the essential 'place' components, the 'kind of place' elements comprising the habitat of a species. These, then, may be considered the common denominators of a habitat transcending two or more habitat types."

WILDLIFE--NATURAL AREAS & REFUGES

Dowling, Paul Bruce. (Nature Conservancy, St. Louis, Mo.) NATURAL AREAS AND EDUCATION. Trans. 23d N. Am. Wildl. Conf.: 560-566. 1958.

Discusses the value of natural areas in education and tells how to select, obtain, manage, and keep such areas in perpetuity.

Gilligan, James P. (U. Calif., Berkeley.) WILDERNESS--A VALID FEDERAL LAND USE. Am. For. 65(1): 8, 50. Jan. 1959.

Shanklin, John F. (US Dept. Int., Wash., D. C.) NATURAL AREA VALUES. Proc. Soc. Am. For. Meeting 1957: 26-27. 1958.

The Comm. on Natural Areas of Soc. Am. For. has helped get 82 natural forest areas set aside. These are in 30 states. They represent 44 of the 106 type associations in the E. and 32 of the 50 in the W. There are others in Alaska and Puerto Rico. The Comm. feels that it can do little more without a paid representative who can devote time and field effort to the project. Areas should not be smaller than 10 acres and need not be larger than 1000 acres. They should be free of recreational use and should be left as undisturbed as possible. Their function is education and research--now and in the foreseeable future.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Baker, Rollin H. (Mich. State U., E. Lansing.) THE FUTURE OF WILDLIFE IN NORTHERN MEXICO--A PROBLEM IN CONSERVATION EDUCATION. Trans. 23d N. Am. Wildl. Conf.: 567-574, 1 map. 1958.

Rapid encroachment of an expanding farming, ranching, and industrial economy in n. Mexico, coupled with general apathy of the people toward the necessity of practicing sustained-yield management of renewable resources, is causing rapid decline in many important wildlife species. Suggested actions include emphasizing need for increased conservation education, investigations of the status of big game herds, and establishment of national or state parks and preserves, including the Mexican part of the proposed Big Bend International Peace Park. A brief description of n. Mexico, its human population and land-use, and its major wildlife species, is presented.--Author.

Dementiev, G. P. (U. Moscow, USSR.) THE PROTECTION OF FAUNA IN THE U.S.S.R. Atlantic Nat. 14(1): 11-21, 2 figs. Jan.-Mar. 1959.

Translated by John Covert Boyd III from the French version in Proc. & Papers of 6th Tech. Meeting of Internat. Union for Cons. Nat. & Nat. Resources. A closely similar paper, also in French, appeared in La Terre et la Vie 104(4), p. 305-317 and was abstracted at length in WR 92 p. 15. An English version of the article from La Terre et la Vie appeared in the Oct.-Nov. 1958 issue of N. Y. State Cons.

Lincoln, Frederick C. (US F&WS.) SAVING NORTH AMERICA'S ENDANGERED SPECIES. Oryx (J. Fauna Pres. Soc., London.) 4(6): 365-372. Dec. 1958.

Ivory-billed woodpecker and Eskimo curlew are extinct in N. Am. Woodland caribou is gone from U. S. but persists in Canada. Safely off the danger list are trumpeter swan, Hudsonian godwit, and sea otter. Discussed in more detail (about 1 p. each) are the status and conservation of key deer, whooping crane, nene, and Laysan teal. Numbers of Laysan teal are at historic high. Author gives brief notes on status and conservation of Kirtland's warbler, prairie chickens, Calif. condor, Cape Sable seaside sparrow, Everglade kite, Puerto Rican parrot, walrus, and polar bear.

Petrides, George A., and Wendell Swank. (Mich. State U., E. Lansing.) MANAGEMENT OF THE BIG GAME RESOURCE IN UGANDA, EAST AFRICA. Trans. 23d N. Am. Wildl. Conf.: 461-477, 4 figs. 1958.

The game resource in Uganda is rich--much of the country's character and considerable tourist income will be lost if further depletion occurs. Under African conditions, big game preservation requires areas of suitable habitat set aside primarily for that purpose. Location, topography, history, land-use pattern, tsetse fly influences, variety of animal life, African interests in wildlife preservation, and history of game management in Uganda are reviewed. The present game reserve and sanctuary system seems to have several weaknesses. A system of managed hunting areas is suggested. This would have several important values. In addition, the national park system could benefit through control of overgrazing caused by game, and through expansion to include presently unrepresented biotic areas. Serious erosion and range damage caused especially by overabundant hippopotami in Queen Elizabeth National Park require prompt and adequate control measures. Both National Park and Game Department officials are dedicated to their work and should be supported to the fullest. In natural area preservation, the importance of planning safeguards against possible encroachments 50 to 100 years ahead is stressed. The need to keep nature unspoiled is recognized, but overgrazing even by wild animals, unlike failures to harvest plant crops, results in habitat deterioration that is difficult to reverse. Natural areas today often are islands amid lands devoted to other purposes, and their biotas are more susceptible to destruction than on widespread wild areas. Wild lands today often require management to preserve their wilderness character.--Authors.

Treichel, George. (30 E. 40th St., N. Y. 16.) AFRICA--AND OUR WILDLIFE HERITAGE. PART II. Animal Kingdom 62(1): 23-28, 8 photos. Jan.-Feb. 1959.

Discusses problems of wildlife conservation in the 90% of Africa that is not in parks. Over half the original wildlife areas have been eliminated and over 3/4 of the animals have been destroyed in the remaining areas. Wildlife populations outside parks generally are confined to tsetse-fly belts and arid regions

unsuitable for more intensive use. "It is entirely fair to state that most wildlife in Africa exists only because the tsetse has prevented intensive stock-raising and agricultural expansion." Poaching is widespread and done on a large scale. In Tanganyika, more animals are destroyed by poaching in a week than by big-game hunting in a year. In general, the view prevails that wildlife is something to be eliminated and replaced by domestic stock whenever possible. In arid regions this process leads to overstocking, soil-erosion, and ultimate devastation. In many areas that still have herds, maintenance of the herds as a renewable, harvested resource is the best long-term economic use of the land, and should be promoted from this view. "Game will not be maintained by natives for sentimental reasons." Basic biological studies for proper herd management are needed. Economic incentives and public education are necessary to maintain the herds outside the parks and also for preservation of the parks themselves. --L. F. Stickel.

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Committee on Animal Nutrition. NUTRIENT REQUIREMENTS OF DOMESTIC ANIMALS. Natl. Acad. Sci.--Natl. Res. Council, Wash. 25, D. C. Varying pages, dates, and prices. Order from Natl. Acad. Sci.

Good review papers, by panels of specialists, in the form of separate pamphlets. Data on this series, as of Feb. 19, 1959, are:

No. 1. Poultry. Revised 1954. Out of print. Will be reissued at $1.00.

No. 2. Swine. Revised 1953. Out of print. Will be reissued at $1.00.

No. 3. Dairy cattle. Revised 1956. $1.00

No. 4. Beef cattle. Revised 1958. $1.00.

No. 5. Sheep. 33 p. Revised 1957. $1.00.

No. 6. Horses. 1949. 50¢.

No. 7. Foxes and minks. 30 p. 1953. 50¢.

No. 8. Dogs. 1953. $1.00.

No. 9. Rabbits. 12 p. 1954. Out of print. If reprinted will be $1.00.

Hinde, R. A. (Madingley Field Sta., Dept. Zool., Cambridge, Eng.) BEHAVIOUR AND SPECIATION IN BIRDS AND LOWER VERTEBRATES. Biol. Reviews of Cambridge Philosophical Soc. 34(1): 85-128. Feb. 1959.

Long and valuable review paper based on about 325 references. "Behaviour mechanisms in food, mate and habitat selection in birds and lower vertebrates are reviewed, with special attention to interspecies divergence in the absence of selection for divergence as such."

Urquhart, F. A. A DISCUSSION OF THE USE OF THE WORD "MIGRATION" AS IT RELATES TO A PROPOSED CLASSIFICATION FOR ANIMAL MOVEMENTS. Roy. Ont. Mus. Zool. and Paleo., Contr. 50: 1-11. 1958. [From Biol. Abst. 33(1).]

Certain previous definitions of the word "migration" are reviewed and the term expanded to include change of location that is not necessarily periodic. He would use "movement" as a most general term, including involuntary dispersal, migration and nomadism. Migration would be divided into emigration, immigration, and remigration, and remigration in turn divided into daily remigration and annual remigration. He suggests also that adjectives and descriptive phrases should be used to define more clearly a particular type of movement. Examples, with some discussion, are given to illustrate these terms.

WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Allen, Durward L. (Purdue U., Lafayette, Ind.) POISON FROM THE AIR. Field & Stream 63(10): 49-51, 129, 4 photos. Feb. 1959.

The campaign against the imported fire ant is costing $5,000,000 a year and may last for 20 years or more. In the first year, some half million acres were treated by airplane with heptachlor or dieldrin at rate of 2 lbs. per acre--about equivalent to 20-40 lbs. per acre of DDT. Wildlife investigators found large numbers of dead birds, mammals, and other animals in treated areas. Analysis proved that many of them contained lethal amounts of the poisons. Quail coveys were nearly eliminated from treated areas. Earthworms, an important food for wildlife, accumulate poisons. Laboratory tests demonstrated that dieldrin or heptachlor in the diet of quail greatly reduced breeding success. No young birds survived to the next breeding season if there were any heptachlor at all in their daily ration. This may or may not happen in the field--no one knows, for the control program got under way without benefit of research on effects. Is the fire ant bad enough to justify this dangerous control program? This ant isn't even listed in the USDA's Yearbook for 1952, "Insects". In May 1958 it was listed by only two states as an important pest, and it was not listed by Ala., which is supposed to be overrun by the ant. Entomologists found that the ant is considered beneficial in Argentina, and found that it was mainly insectivorous, seldom attacked crop plants, and would become cannibalistic rather than eat some crops it was reported to relish. No damage to livestock by ants was found. The ant is a pest, because of its mounds and stinging, but good local controls are well known. The fire-ant campaign got rich quick and went too far too fast. Improvements in methods are needed. Pest control is necessary and is here to stay. But spreading poisons over the land is a pretty crude way to kill bugs. We need safe, sound methods. Some are known, but much research is still needed.

Allen, Ralph H., Jr. (Ala. Dept. Cons., Montgomery.) WILDLIFE LOSSES IN SOUTHERN FIRE ANT PROGRAM. Passenger Pigeon 22(4): 144-147, 1 photo. Winter 1958.

Study in Ala. revealed no instance of imported fire ants harming wildlife. The State Dept. Cons. was taken by surprise when fire-ant-control program began, but was assured by agricultural officials that little or no harm would be done by it. The Dept. Cons. sent out cards to all residents of one area to be treated, and asked for information on damage to animals. This move was countered by broadcasts and publicity about how the recent cold spell would cause mortality. But animals killed by "cold" all proved to contain heptachlor. In various treated areas, mortality ranged up to 100%. Lists are given of many kinds of animals found dead. The Ala. Dept. Cons. is demanding stoppage of the whole program until methods can be devised to safeguard wildlife, song birds, fish, and human beings.

Allen, Ralph H., Jr. (Ala. Dept. Cons., Montgomery.) HISTORY OF THE IMPORTED FIRE ANT IN THE SOUTHEAST. p. 1-7 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

The imported fire ant appeared at the Port of Mobile about 1918 and was confined to the same general area in 1928. Rate of spread increased to 1-3 miles per year, 1932-50, was more rapid 1950-58. Much erroneous information has received widespread publicity. The ant is primarily insectivorous. Although it is a nuisance, it can not be considered a major economic pest, for in May 1958 only La. and Miss. listed it among their 20 most important pests, and then far down the list. The state medical officer for Ala. stated that no deaths in Ala. have been reported as the result of fire ant bites, and that medical cases have been minor and incidental. Present procedures and regulations in Ala. are described. "If the fire ant program was ever an eradication program, which most of us have doubted from the beginning, it can no longer be so classified. It is now a control program, pure and simple." Bibliography of 91 titles.--L. F. Stickel.

Anon. BIBLIOGRAPHY ON PESTICIDES TOXICITY AND ACCIDENTAL POISONING. World Health Organization, WHO/Insecticides/81. 1 + 9 p., mimeo. July 1958.
"This bibliography is a continuation of a series issued every six months by WHO and includes selected references of articles which have been brought to its attention during the period 1 January 1958 to 30 June 1958." Includes citations, but no abstracts, of articles dating from 1955 to 1958. Most citations pertain to human toxicology or laboratory animal studies. Few if any papers listed in this issue deal specifically with wildlife.

Anon. QUOTABLE QUOTES ON THE IMPORTED FIRE ANT CONTROL PROGRAM. Ala. Cons. 30(4): 16-19, 25, 1 photo. Dec.-Jan. 1958-9.
A roundup of 14 statements on damage to wildlife attributable to treatment of areas with insecticide, particularly for fire ants. Some of these 14 statements are from well-known papers listed in WR; others are from less familiar or unpublished sources. In all, they report severe wildlife mortality and cast much doubt on the wisdom of the fire-ant program.

Arant, F. S., Kirby L. Hays, and Dan W. Speake. (Ala. Poly. Inst., Auburn.) FACTS ABOUT THE IMPORTED FIRE ANT. Ala. Cons. 30(4): 20-22, 5 photos. Dec.-Jan. 1958-9.
Summary of research results. History and biology of ant are reviewed. Food is mainly insects, including many pests. Damage to plants is rare, except that resulting from mound building, but a few crops are sometimes attacked. Captive colonies become cannibalistic rather than feed on plants they are reported to relish. Livestock graze and lie down near mounds. Newly born stock is rarely if ever killed. Mounds do interfere with machinery. Stings bother workmen, but cause no severe or lasting effects unless one is allergic. Experimental control with granular insecticides did not harm vigorous cattle or sheep when occupied pastures were treated in winter. Imported fire ants apparently have not lowered quail productivity. Ant control, however, practically wiped out quail on the famed Camden test area, and killed many other animals as well. [For data on Camden tests, see Baker and Clawson, this issue WR.]

Baker, Maurice F. (Ala. Poly. Inst., Auburn.) OBSERVATIONS OF EFFECTS OF AN APPLICATION OF HEPTACHLOR OR DIELDRIN ON WILDLIFE. p. 18-21 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].
Report of studies near Camden, Ala. Study areas included 2400 acres treated (by aerial application) with heptachlor and 1200 acres treated with dieldrin (each at 2 lbs. active ingredient per acre) and a 600-acre untreated check area. Catch-pans showed very unequal distribution of chemical. Treatments resulted in total kill of 13 coveys of quail that ranged all or most of the time on treated land. Chemical analyses of dead birds showed poison in sufficient quantities to cause death in all but 1 bird. Two coveys, that ranged mostly off treated land, survived. A wide range of other vertebrate animals was killed, including mammals, birds, reptiles, amphibians, and fish. In general, the dead were found in habitats most suitable for each kind. The first 100 specimens recovered were chemically analyzed and lethal amounts of poison were found in all but 6. Fish in temporary waters and small tributary streams appeared to have been completely eradicated, but some amphibians survived. No abnormal mortality was found on the check area.--L. F. Stickel.

Clawson, Sterling G. FIRE ANT ERADICATION...AND QUAIL. Ala. Cons. 30(4): 14-15, 25. Dec.-Jan. 1958-9.
Effects of fire-ant control on bobwhite were studied near Camden, Ala., early in 1958. A 3,600-acre area was treated with 2 lbs. per acre of heptachlor or dieldrin. Quail were censused before and after treatment, and on a check area of 600 acres. On treated area, 13 of 15 coveys disappeared, and the other 2 ranged largely outside the area. Check area lost only 2 individual quail. Dead and dying birds were found on the treated area within 4-5 days. Twenty-one dead quail were found. Nine of these were analyzed and found to contain insecticide in lethal amounts. In short, mortality among quail that spent all or most of their time on treated land appeared to be 100%. In addition, animals of more than 60 species were found dead: birds, mammals, reptiles, amphibians, fishes. Most carcasses proved to contain insecticides. Young foxes apparently died from secondary poisoning.

Cottam, Clarence. (Welder Wildl. Found., Sinton, Tex.) A COMMENTARY ON THE FIRE ANT PROBLEM. p. 31-34 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

"Based on most of the facts that I have thus far seen, I am forced to conclude that the fire ant program as presently directed is a good example of how not to proceed. It seems to me the present operation is immature and irresponsible and, perhaps, it may be doing more public harm than good--even without considering the millions of dollars of Federal, State and local funds (mostly tax dollars) being used in the process... The five main reports of this session leave no doubt that damage is widespread and serious to animal life in areas treated with aerial application of the poisons... On many areas that have been treated for fire ant eradication and where the results have been investigated by wildlife biologists, farmers have volunteered information concerning the loss of livestock following such treatment... It is obvious that such dangerously toxic materials should be applied...only where there is an overwhelming need and where less drastic and damaging controls cannot be successfully employed... A major criticism of the control program involves the use of stable deadly poisons used at alarming concentrations with the expectation that the killing power will remain on the areas treated for several years (possibly three to five or even longer) and with little research on what effects such concentrations of poisons will have on other interests and resources. Almost nothing is known of the long-time and indirect effects of these poisons upon soil organisms, beneficial insects, wildlife, domestic stock or upon humanity itself... The risks are too high for such foolhardy irresponsibility as we are witnessing in the present fire ant control program... Until much more is known about the good and bad effects of the ant and the dangerously poisonous insecticides used in control, it would be in the public interest to halt the control program and especially the indiscriminate aerial applications. The remaining fire ant funds should be transferred to research."--L. F. Stickel.

Glasgow, Leslie L. (La. State U., Baton Rouge.) STUDIES ON THE EFFECT OF THE IMPORTED FIRE ANT CONTROL PROGRAM ON WILDLIFE IN LOUISIANA. p. 24-29 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

Report on studies in Acadia and St. Landry parishes and in another area in Baton Rouge Parish. Both areas were treated with heptachlor at about 2 lbs. technical material per acre. Many dead animals were found, including birds, mammals, fish, reptiles, and crayfish. In the Baton Rouge area, muskrats remained active in bank burrows all summer; there was a partial kill of minnows and crayfish. Live toads and green tree frogs were seen through the summer. A nesting study showed that few birds fledged. Bird counts showed disappearance of redwinged blackbirds (from about 135), meadowlarks (from about 27), and quail (from 4), but an increase in mourning doves. "The number of earthworms on both treated and non-treated farms decreased but the decrease on treated farms was much greater through July. After that date, the treated farms began to recover while the non-treated field deteriorated." Earthworms collected on treated areas contained significant amounts of heptachlor 5 months after treatment of the area. These worms may constitute a hazard to ground-feeding birds.--L. F. Stickel.

Henderson, Croswell, and Quentin H. Pickering. (US Pub. Health Serv., Cincinnati, Ohio.) TOXICITY OF ORGANIC PHOSPHORUS INSECTICIDES TO FISH. Trans. Am. Fish. Soc. 87: 39-51. 1957 [1958]. [From Biol. Abst. 33(3).]

Bioassays were made on 10 compounds, including organic phosphates, thiophosphates and phosphonates. Different compounds exhibited a wide range in toxicity, with 96 hour TL_m values ranging from 0.2 to 121 ppm. No relationship was apparent between toxicity and chemical structure. With 1 exception, dilution waters with different pH, alkalinity, and hardness apparently had little or no effect on toxicity. Bluegills were more sensitive to several compounds than fathead minnows. The compounds were less toxic to fish than many chlorinated hydrocarbons. No definite correlation could be established in toxicity of organic phosphorus compounds between fish, insects and mammals.--From auth. abst.

Kemper, Charles A. (733 Maple St., Chippewa Falls, Wis.) CONSERVATION COMMENTS. Passenger Pigeon 22(4): 167-169. Winter 1958.

Wis. state agencies have adopted an administrative code that governs "Use of Toxic Insecticides for the Destruction of Injurious Insects on Forest and Non-Crop Areas." The regulations are reproduced here. Kemper discusses the need for such regulations and points out ways in which he would like to see the code more restrictive.

Lay, Daniel W. (Tex. Game Comm., Buna.) FIRE ANT ERADICATION AND WILDLIFE. p. 22-24 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

Effects on wildlife of aerial application of 2 lbs. technical grade heptachlor per acre were studied on a 2500-acre ranch in Hardin Co., Tex. Heavy loss of wildlife resulted. Part of the area was treated in May. After this treatment, 114 dead birds of 19 species, including quail, doves, and snipe, were found with only 43 man-hours of searching. Dead mammals found included cottontails, armadillos, raccoons, opossums, nutria, cotton rats and rice rats. All of the 41 specimens analyzed contained lethal amounts of heptachlor. Dead fish, frogs, and crawfish were present in all treated waters. Similar mortality resulted when the remainder of the area was treated in May, when the ground was drier. Bird counts along ranch roads showed 94-97% decline in 2 weeks, 73-95% decline after 4 weeks, and 67-90% decline after 4 months. Counts of birds in 45-acre plots showed similar trends. Nesting success of blackbirds was reduced 50% on areas treated in March, 100% on areas treated in May. Of 17 nests of other species that were found (all on the May area), only 1--a nighthawk--was successful. Dead birds were found at their nests. There was unexpected loss of 11 calves and 4 bulls from a herd of 70 and 8; heptachlor may be suspected as the cause of at least some of the losses, but there were various complicating factors, so one cannot be certain. "The present so-called 'eradication' program is in fact a spot control program. Until more facts are available, I question the wisdom of the program."--L. F. Stickel.

Mehner, John F., and George J. Wallace. (Mich. State U., E. Lansing.) ROBIN POPULATIONS AND INSECTICIDES. Atlantic Nat. 14(1): 4-9, 5 figs. Jan.-Mar. 1959.

Research report with content similar to that of Wallace, Aud. Mag. 61(1), which is reviewed in this issue of WR.

Newsom, John D. (655 Hailey, Slidell, La.) A PRELIMINARY PROGRESS REPORT OF FIRE ANT ERADICATION PROGRAM CONCORDIA PARISH, LOUISIANA, JUNE, 1958. p. 29-31 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

Report through July 10, 1958 of studies on a 2600-acre area treated June 27-29, 1958 with 3.2 lbs. technical grade heptachlor per acre. Roadside counts of birds on treated area showed 53.9 per mi. before treatment, 18.8 per mi. afterwards. On the check area, counts were 41.9 and 49.4 per mi. Fencerow counts showed a 68% decline of birds in one study area, 78% decline in the other. One week after spraying, 95 domestic geese, 38 other birds of 10 species, and 2 rabbits were found dead. Carcasses of all 3 geese and all but 1 of 14 songbirds analyzed contained lethal amounts of heptachlor. No evidence of damage to fish or aquatic life in farm ponds was noted, although there was light fish kill in a canal and in borrow pits.--L. F. Stickel.

Rosene, Walter, Jr. (127 Oak Circle, Gadsden, Ala.) WHISTLING-COCK COUNTS OF BOBWHITE QUAIL ON AREAS TREATED WITH INSECTICIDE AND ON UNTREATED AREAS, DECATUR COUNTY, GEORGIA. p. 14-18 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

"A summer whistling-cock count of bobwhite quail was made on six areas that had been treated with heptachlor or dieldrin, [2 lbs. active ingredient per acre] and on six control areas that were untreated. A total of 9,901 acres was censused on treated transects and 10,826 on controls... Whistling cock quail averaged 3.74 per 1,000 acres on treated areas, and 27.43 per 1,000 acres on untreated lands... In the three- to six-month period between chemical treatment and the time of the quail census, the birds did not repopulate the treated lands to the level that was found on control areas... With one exception birds that were heard on treated areas were close to untreated lands."--L. F. Stickel.

Rudd, Robert L. (U. Calif., Davis.) THE INDIRECT EFFECTS OF CHEMICALS IN NATURE. p. 12-16 in "The Effects of Toxic Pesticides on Wildlife," papers given at 54th Ann. Conv. Natl. Aud. Soc. Natl. Aud. Soc., 1130 5th Ave., N. Y. 28, N. Y. Nov. 1958.

Important paper with new and stimulating thoughts on pesticide problems. We are accustomed to thinking of direct kills of wildlife by insecticides, but subtler effects of great significance are less known: 1. Interference with food chain. Insecticides kill off food organisms and lead to mass starvation of wildlife. This is well known with fishes of several areas and has happened to raccoons and to beneficial insects. Another aspect is that organisms low in the food chain may concentrate the chemical, as Barker proved for earthworms. Also, a chemical may be in low concentration at the bottom of a food chain and become concentrated as it goes up the food chain, simply because of number of individuals involved. Clear Lake, Calif., was treated with DDD for control of gnat. Results were considered splendid, harmless to wildlife. Treatment had to be repeated frequently to keep down the gnat. But even after 1st treatment, the breeding w. grebes disappeared. By 7th year hundreds of migrant grebes died, and the one analyzed contained a high concentration of the metabolic product of DDD. Fish contained amounts above residual tolerance levels of Food & Drug Admin. Treatments were stopped in 1958; record gnat hatch was indicated. 2. Faunal displacement. Remove one pest by treatment and another shows up to require more treatment, sometimes because 1st treatment killed off biological-control organisms. 3. Chemical alterations. Chemicals taken up by plants and animals may be converted to more toxic forms. There is now talk of making whole forest plantations toxic to wildlife by use of systemic chemicals. Pests often develop resistance or avoidance to pesticides--the usual human response is more and stronger chemicals. Wildlife, however, may respond by lowered survival and reproductive success, as DeWitt has shown. There is even 1 example of genetic effects. Control officials tend to be very specialized, aware only of their own objectives, and mentally straight-jacketed in their approach to conservation and wildlife problems. They also tend to have the "production fetish," the idea that an ever-greater rate of food and fiber production is the sole objective, regardless of troublesome surpluses and questions of quality.

Symposium. THE FIRE ANT ERADICATION PROGRAM AND HOW IT AFFECTS WILDLIFE. Preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1-34 p. 1958 [1959]. Published by SE. Assn. Game & Fish Comms., Box 360, Columbia, S. C. Single copies available, while supplies last, from game depts. of Gulf states and from Branch Wildl. Res., US F&WS, Wash., D. C.

Eight authoritative papers on the effects of the fire ant program are presented as a handy pamphlet. Component papers are reviewed individually in this issue of WR. "The Southeastern Association Game and Fish Commissioners based on the information presented herein, goes on record as opposing the broadcast application of dangerous insecticides until further information is obtained concerning effect on public health and fish and wildlife."

Tarzwell, Clarence M. (US Public Health Serv., Cincinnati, Ohio.) THE TOXICITY OF SOME ORGANIC INSECTICIDES TO FISHES. p. 7-13 in "The Fire Ant Eradication Program And How It Affects Wildlife," preprint from Proc. 12th Ann. Conf. SE. Assn. Game & Fish Comms. 1958 [1959].

Facts are summarized concisely in a series of tables: (1) comparative toxicity of organic phosphorus insecticides to fish, insects, and mammals, (2) comparative toxicity of chlorinated hydrocarbons to different species of fish, (3) comparative toxicity of chlorinated hydrocarbon and organic phosphorus insecticides, (4) comparative toxicity of chlorinated hydrocarbons to fish, insects, and mammals, (5) amounts of chlorinated hydrocarbon that produce 50% mortality of fish when applied to water surfaces. The author concludes, "Biological control based on a knowledge of the environmental requirements of the species to be controlled is generally the preferred and most economical means of control. If such methods are inadequate or too slow biological and chemical control methods can often be effectively combined... Before toxicants are widely used their toxicity to other organisms in the biota should be determined... In widespread spraying for the control of forest and agricultural pests it is believed that certain of the organic phosphorus compounds especially the newer ones some of which are not very toxic to fishes, would be safer than most of the chlorinated hydrocarbons from the standpoint of aquatic life. This also applies to a newly developed carbamate."--L. F. Stickel.

Wallace, George J. (Mich. State U., E. Lansing.) INSECTICIDES AND BIRDS. Aud. Mag. 61(1): 10-12, 35, 4 photos. Jan.-Feb. 1959.

Robins of the Mich. State U. campus were virtually exterminated within a few years. Main cause was DDT used for control of Dutch elm disease and, in lighter doses, for mosquito control. Many robins were found dead or with typical DDT tremors. Heavy mortality occurred in spring, when birds got many earthworms that had in them DDT they had concentrated from soil and fallen-leaf litter. Reproduction failed almost entirely in the few robins that survived. Incomplete data reveal similar conditions in other communities that have intensive program for control of Dutch elm disease. Little or no decline is reported from untreated communities. Ground-feeding birds other than robins have suffered heavy mortality in treated areas. Tree-top-feeding and trunk-feeding birds have virtually disappeared from the Mich. State U. campus and many kinds of them have been found dead after spraying. 49 of the 77 species that were summer residents at E. Lansing have disappeared or decreased in numbers--most of them species that have suffered from insecticides. All the species associated with elms are about gone. Native insectivorous birds are being replaced by nuisance species such as starlings, English sparrows, pigeons, and grackles. Dr. Wallace concludes: "(1) The current widespread and ever expanding pesticide program poses the greatest threat that animal life in North America has ever faced--worse than deforestation, worse than market hunting and illegal shooting, worse than drainage, drought, or oil pollution, and possibly worse than all of these decimating factors combined. (2) The present ill-conceived and ineptly executed fire-ant 'eradication' program will go down in history as one of the worst biological blunders that man has ever made. (3) If this and other pest-eradication programs are carried out as now projected, we shall have been witnesses, within a single decade, to a greater extermination of animal life than in all the previous years of man's history on earth, if not since glaciation profoundly altered the life of the whole northern hemisphere."

WILDLIFE--PARASITES & DISEASES

Duarte, G. G., and M. Barreto. SEQUENTIAL ANALYSIS IN THE EVALUATION OF THE EFFICIENCY OF LABORATORY METHODS FOR THE DIAGNOSIS OF PARASITIC DISEASES. Rev. Assn. Med. Brasil. 4(2): 109-116. 1958. [From Biol. Abst. 33(4).]

In Portuguese. The main purpose of this paper is to call the attention of parasitologists to the advantages of sequential analysis. As examples the authors apply Wald's 2 designs to data already published. One design affords a rapid and economical solution to the problem of comparison of 2 diagnostic methods, and the other, the evaluation of the efficiency of a method, given the pertinent conditions.--Auth. summ.

Karstad, L. H., and R. P. Hanson. (U. Wis., Madison.) INFECTIONS IN WILDLIFE WITH THE VIRUSES OF VESICULAR STOMATITIS AND EASTERN EQUINE ENCEPHALOMYELITIS. Trans. 23d N. Am. Wildl. Conf.: 175-186. 1958.

Authors review their own work and that of many others in discussing results of serological surveys of occurrence of these diseases in wildlife, and results of experimental transmission studies. Much of the authors' work was done on se. coastal plain. Both diseases occur in many wildlife species, often with mild symptoms or none. Transmission and over-wintering of stomatitis is not yet understood despite much work. Transmission of encephalitis is better understood, but there are still problems. "In the study of these two diseases we have learned to exercise caution in incriminating wild animals as reservoirs of infection. The wild animal hosts for these viruses that have been studied appear to be as dependent upon other unknown sources for infection as are man and his domestic animals. It is felt that in the past, errors made might on occasion have been avoided had a more thorough study of the situation been made before concluding that wild animals perpetuated livestock or human disease."

Rosen, Merton N., and Eugene E. Morse. (Calif. Dept. Game.) AN INTERSPECIES CHAIN IN A FOWL CHOLERA EPIZOOTIC. Calif. Fish & Game 45(1): 51-56, 1 map. Jan. 1959.

Fowl cholera (caused by Pasteurella multocida) broke out in Jan. 1958 in the customary fashion, in coots in 2 areas near San Francisco Bay. As usual, it soon spread to and killed many ducks. Storms then caused most waterfowl to leave these areas, and epizootic there ended. Apparently, infected waterfowl flew to Lower Klamath Refuge and started new epizootic. This outbreak killed large numbers of waterfowl. A famous plague of mice (chiefly Microtus montanus) was occurring at Klamath. The disease got into mice, presumably from mice eating disease-killed birds, and practically wiped out the mouse populations. From eating diseased mice, many predators also got the disease and died. Among these were gulls, short-eared owls, marsh hawks, and weasel. Infection in mice and predators prolonged the epizootic by 4-6 weeks, but effects on waterfowl were less late in the outbreak, perhaps because waterfowl became more resistant or the disease less virulent. Serological tests for fowl cholera did not give cross reactions with tularemia, which was also present in Klamath animals at the time.

WILDLIFE--POPULATIONS & FLUCTUATIONS

Andrewartha, H. G. (U. Adelaide, Australia.) DENSITY-DEPENDENT FACTORS IN ECOLOGY. Nature 183(4655): 200. Jan. 17, 1959.

The idea of density-dependent factors is considered fruitless. Certain of Nicholson's arguments in favor of the importance of density dependent factors are criticized. Also criticized severely is one of Nicholson's formulas.

WILDLIFE--BIOMETRICS

Goodman, L. A., and W. H. Kruskal. (U. Chicago.) MEASURES OF ASSOCIATION FOR CROSS CLASSIFICATIONS. J. Am. Stat. Assn. 49(268): 732-764. Dec. 1954.

"Our major theme is that the measures of association used by an empirical investigator should not be blindly chosen because of tradition and convention only, although these factors may properly be given some weight, but should be constructed in a manner having operational meaning within the context of the particular problem."--V. Schultz.

Goodman, L. A., and W. H. Kruskal. (U. Chicago.) MEASURES OF ASSOCIATION FOR CROSS CLASSIFICATIONS. II. FURTHER DISCUSSION AND REFERENCES. J. Am. Stat. Assn. 54(285): 123-163. Mar. 1959.

Contains the following sections: (1) Introduction and summary. (2) Supplementary discussion to prior paper. (3) Work on measures of association in the late 19th and early 20th centuries. (4) More recent publications. Only a very few of the references pertain to ecological projects; the subject material, however, should be of interest to ecologists.--V. Schultz.

Madansky, A. (RAND Corp., 1700 Main St., Santa Monica, Calif.) THE FITTING OF STRAIGHT LINES WHEN BOTH VARIABLES ARE SUBJECT TO ERROR. J. Am. Stat. Assn. 54(285): 173-205. Mar. 1959.

Discusses problem of obtaining consistent estimates of the intercept and slope of the regression of Y on X. Confidence limits and tests of hypotheses are not discussed.--V. Schultz.

Quick, Horace F. (U. of Maine, Orono.) ESTIMATING THE EFFECTS OF EXPLOITATION BY LIFE TABLES. Trans. 23d N. Am. Wildl. Conf.: 426-442, 3 figs. 1958.

Survival and mortality curves were constructed from life tables prepared from the record of the controlled extermination of a roe deer herd in Denmark (Andersen, 1953). The forms of survival-mortality curves at known levels of exploitation (first 25% killed; first 50% killed; first 75% killed) were compared with the form of the survival-mortality curve representing the structure of the whole population. Interpretations of the variations of these curves were made to illustrate the application of the method. The hypothesis is offered that population management can be accomplished by similar methods. Changes in the

structures of populations can be measured and in some cases procedures can be prescribed for bringing a population under control. The hypothesis applies to animal species which can be identified into a number of age classes. Several kill records from national wildlife refuges are cited as exemplary cases.--Author.

Sachs, Rose. (Food & Drug Admin., Wash., D. C.) LIFE TABLE TECHNIQUE IN THE ANALYSIS OF RESPONSE-TIME DATA FROM LABORATORY EXPERIMENTS ON ANIMALS. Toxicology & Applied Pharmacology 1(2): 203-227, 5 figs. Mar. 1959.

Life table technique is a statistical procedure recommended for use in the study of some response-time data from laboratory experiments on animals. The characteristics of such data are discussed. The text describes studies in various subject matter fields in which this method is applied. Several statistics may be derived by life table technique. In some investigations, the survivorship, mortality, or other response to any desired time in the experiment is estimated. The survivorship curve may serve to show the distribution of the responses. The average remaining lifetime of each group at selected time points in the study may be measured; also the average survival time, which is the average remaining lifetime of each animal at the beginning of the experiment. Measures of sampling variability may be utilized to determine confidence limits and to test the statistical significance of results. Computation of a life table is explained in Part II.--Auth. summ.

WILDLIFE--TECHNIQUES

Anon. SNOW-SURVEY SAFETY GUIDE. US Dept. Agr., Soil Cons. Serv., Agr. Handbook no. 137. 74 p., illus. 1958. 40¢ from Supt. Documents. [From review by Shirley A. Briggs, Atlantic Nat. 14(1).]

A terse, clear handbook for men who have to work in snow covered mountains. "It deals with suitable clothing and gear, means of travel, care of equipment, and action in emergencies, including first aid. ...the advice and precautions given here are...applicable to anyone coping with snow in remote places."

Cosper, P. M. (Ariz. Game Dept.) SELLING HUNTING SEASON RECOMMENDATIONS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comm.: 197-199. 1958.

Regulation of hunting seasons can progress only as fast as the public and commissioners are convinced. The first necessity is to work out a united stand within the department, then with any cooperating agencies such as the Forest Service. One must take a long-range approach: start working for something before you actually have to have it, but don't try for more at any one time than you have a chance of getting. Ask for too much at once and you jeopardize your whole program. Proof based on in-state examples carries the most weight, and justifies duplicating another state's work. Field demonstrations are effective. Encourage audience participation at hearings. Many of the participants are repeaters and you can learn to cater to them and to be braced for their questions. Send them back to their groups satisfied with your answers. Don't clutter the hearing room with graphs and maps. Instead use color slides by which everyone can see the details. Have your biologists on hand prepared to give full treatment to any proposal that proves to need it. The men should be fortified in advance by departmental conferences in which they are hit with all the difficult questions that can be thought up, and in which the group tries to work out the best answers. These techniques have worked well to reduce opposition to recommendations in Ariz.

Hayes, F. A., J. H. Jenkins, S. D. Feurt, and J. A. Crockford. (U. Ga., Athens.) THE PROPULSIVE ADMINISTRATION OF NICOTINE AS A NEW APPROACH FOR CAPTURING AND RESTRAINING CATTLE. J. Am. Vet. Med. Assn. 134(6): 283-286, 3 figs. Mar. 15, 1959.

Describes the flying syringe and illustrates it in complete detail; presents data on use of the method with cattle; cites a number of important references on the method and its use. Summary: "In 134 trials with the remote delivery of nicotine for immobilizing cattle, the data obtained indicate that the intramuscular administration of nicotine (1.5 mg./lb. of body weight) might prove to be a valuable adjunct to present methods in handling livestock." Needles of different types are available for use on specific kinds of animals.

LeMunyan, Cobert D., Wm. White, Ernest Nyberg, and John J. Christian. (U. S. Naval Med. Res. Inst., Bethesda, Md.) DESIGN OF A MINIATURE RADIO TRANSMITTER FOR USE IN ANIMAL STUDIES. J. Wildl. Mgt. 23(1): 107-110, 2 figs. Jan. 1959.

Relocation of animals after tagging and release has long presented a problem to investigators in population studies. In 1 study in which woodchucks were used, this was particularly true owing to their burrowing habits. Frequently several hours of digging resulted in finding no animal. In an attempt to alleviate this problem, a miniaturized transistor transmitter which could be installed in or on the animal was developed. Weight of unit is 122.5 g. Cost is about $25 for materials. The unit consists of two 2N137 transistors, one operating as an oscillator with a crystal in the 0.19 to 0.55 range, and the other as a class C radio frequency amplifier. A pulsing circuit provides an intermittent signal. Induced, rather than radiated, power is accomplished by feedback utilizing a small ferrite rod antenna. Power is supplied by two TR133-R mercury units which have a field life of approximately 161 days. Effective range is 18-25 yds. Surplus Army BC-453 receivers, one adapted for A.C. current and the other two for 12-volt mobile operation, provide the necessary monitoring to detect and recover the animals in which the transmitters have been installed.--Authors.

Lutz, H. J., and A. P. Caporaso. VEGETATION AND TOPOGRAPHIC SITUATION AS INDICATORS OF FOREST LAND CLASSES IN AIR-PHOTO INTERPRETATION OF THE ALASKA INTERIOR. US For. Serv., Alaska For. Res. Center, Sta. Pap. no. 10. 31 p., illus. Sept. 1958. [From J. For. 57(3).]

MacConnell, Wm. P. (U. Mass., Amherst.) COVER MAPPING MASSACHUSETTS FROM AERIAL PHOTOGRAPHS. Proc. Soc. Am. For. Meeting 1957: 159-162. 1958.

Values, system of classifying types of vegetation, photo interpretation, mapping techniques, preparation of area statistics, costs.

Powell, Lawrence E. (Ariz. Game Dept.) HUNTER REPORT CARDS VERSUS QUESTIONNAIRES. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 235-238. 1958.

"The Arizona Game and Fish Department is planning on using the hunter questionnaire in the future. As to whether this is the best method to determine hunt results on a statewide basis may still be debatable, but this department deems it necessary to proceed with a method that can be made statistically accurate. The hunter report card system did not prove to be statistically accurate in Arizona."

Seton, Ernest Thompson. ANIMAL TRACKS AND HUNTER SIGNS. Doubleday & Co., 575 Madison Ave., N. Y. 22, N. Y. 160 p., illus. 1958. $3.75. [From review by Duryea Morton, Atlantic Nat. 14(1).]

Begun by Seton, finished by Mrs. Seton after his death in 1946. "This book is composed mainly of excerpts from Seton's own notes and is delightfully written. He discusses animal tracks and tracking techniques and gives lively anecdotes based on personal experience to develop his points." Included are 54 clear, life-size drawings. Seton describes various methods of making prints of tracks. "The author explains specific footprints in some detail. He mentions farm animals, eastern animals and those of the western range. The most interesting feature of the book to me was his analysis of the activity of several animals by watching their tracks. He illustrates their movements and then explains what each animal did and on what he based his conclusions. This is certainly a fine lesson in observation and sign reading. Although not intended to be a field guide, ANIMAL TRACKS AND HUNTER SIGNS serves admirably to impart a flavor of excitement and background to track study that should stimulate and arouse the interest of young and old."

Speirs, J. Murray, and R. Andoff. (U. Toronto, Ont.) NEST ATTENTIVITY OF LINCOLN'S SPARROW DETERMINED USING THERMISTOR BRIDGE. Can. J. Zool. 36(6): 843-848, 3 figs. Dec. 1958.

Cheatum, E. L. (N. Y. Cons. Dept.) THE FISH AND WILDLIFE MANAGEMENT ACT. WHERE DO WE STAND AND WHAT OF THE FUTURE? N. Y. State Cons. 13(4): 2-5, 2 figs. Feb.-Mar. 1959.

N. Y. State has a radical new Fish and Wildlife Management Act of 1957. It sets up a whole new system of boards and advisors. Basic aims are to find solutions to the posting problem, to get locally suitable habitat improvement worked into regular land-use activities, and to get proper, orderly harvests. The posting problem seems to be the chief target. Under the new act, the state is divided into 13 districts. Each district has a board composed of 3 members from each county. One of the 3 is a farmer, one is from the co. board of supervisors, one is a sportsman. District boards also include the chairmen of the Soil Cons. Districts and Forest Practices Boards. These district boards are to provide grass-roots planning of suitable practices. Their recommendations must be approved by the state board and Cons. Comm. before being pressed in the districts. The state board consists of representatives from the district boards and has 10 voteless state officials as advisors. The state board coordinates; it makes recommendations to the districts and to Cons. Comm. An agent of the Cons. Dept. works with each district board as helper and advisor, and he is assisted by a biological aide who helps make surveys, etc. The system has been set up and is now beginning to operate.

Evans, Thomas R. (Ill. Dept. Cons.) THE ADMINISTRATOR LOOKS AT RESEARCH. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 94-97. 1958.

Groves, Frank W. (Nev. Game Comm., Reno.) MANAGEMENT OF STATE WILDLIFE MANAGEMENT AREAS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 76-105. 1958.

This paper includes 24 p. of tables showing size, purpose, etc. of each wildlife management area in each of the 11 western states, and provides summary data for these areas. These tables should be of real reference value. Text of the paper discusses policy for management of wildlife areas. Emphasis should be on management and harvest. Refuges, as such, are of no value to big game. Harvest is necessary to keep a stock healthy, as well as to keep it from going to waste. We need more management areas, but we should be sure we don't grab areas that will cost more to manage than they are worth. If we cannot yet manage a new area, we should not take it on unless the habitat does not require management to retain its productivity. Also, we should not cling to areas that have lost their value. On the other hand, if management necessitates production of agricultural crops, we should not be detered by specious claims that we are hurting private producers. As for grazing on wildlife areas, we should remember that we cannot stockpile grass any more than we can stockpile game.

Haik, Raymond A. (Minn. Dept. Cons.) THE LAWYER'S ROLE IN CONSERVATION PLANNING. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 75-80. 1958.

Haik, Raymond A. (Minn. Dept. Cons.) A LAWYER LOOKS AT WILDLIFE CONSERVATION. Cons. Volunteer 22(127): 39-44. Jan.-Feb. 1959.

Demand for use of our lands by competing economic groups requires a basic shift in thinking about wildlife conservation. A possibility of permanent protection lies in land-use zoning and regulation. This zoning in rural areas is only a matter of time. The only question is whether wildlife will have a place in the plan. Wildlife societies and administrators must take the lead, for the farmer will not bear all the load and it is not his duty to develop a wildlife plan. Wildlife administrators should urge formation of local committees, representing a cross-section of the community, to survey local land use and develop plans that will consider wildlife. Planning assistance and factual economic data should be provided to these groups and to landowners.--L. F. Stickel.

Hochbaum, Hans Albert. (Waterfowl Res. Sta., Delta, Manitoba.) THE RESEARCHER LOOKS AT RESEARCH. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 87-94. 1958.

Hochbaum tells what is wrong with our research policies, our general failure to publish results, our ignorance of the literature, our devotion to stereotyped ideas, and our poor choice of problems. According to the author, government agencies, especially the Fish & Wildlife Service, are the chief culprits, but the universities do not escape indictment.

Leonard, Justin W. (Mich. Dept. Cons.) THE CONSERVATION DEPARTMENT LOOKS AT RESEARCH. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 83-87. 1958.

Of necessity, conservation departments are in the research business to stay. We might well stop trying to categorize research as basic, fundamental, or applied: what we need is answers, and we have to follow the problems by whatever approaches are promising. It would be hard to turn up any fact about animal populations or their environment that wouldn't be of practical value to management. We can help ourselves and the colleges by providing them with cooperation and financial assistance, but the bulk of the responsibility is ours.

PROCEEDINGS OF THE THIRTY-EIGHTH ANNUAL CONFERENCE OF WESTERN ASSOCIATION OF STATE GAME AND FISH COMMISSIONERS, Sun Valley, Idaho, June 23-25, 1958. xx + 378 p., mimeo. [1959.] $2.00, paper, from Ben Glading, Calif. Dept. Fish & Game, 722 Capitol Ave., Sacramento 14, Calif.

A paper-bound volume that contains 76 consecutively paged papers on fish and game problems and also discussions and resolutions. Many of the technical game papers are entered in this issue of WR. There are 8 technical fisheries papers, 10 on law enforcement, and 10 on conservation education. There are also groups of papers on problems of water policy, reports on conservation legislation, discussions of state and federal refuge policy (acquisition and management policy), proper use of the various categories of public land, history and future of the Western Association. As usual in this otherwise useful series, most of the papers, including technical ones, lack summaries and therefore deserve to be entered by title only in bibliographic series.

Scott, Thomas G. (Ill. Nat. Hist. Surv., Urbana.) THE ORNITHOLOGIST'S RESPONSIBILITY TO THE FUTURE / A CONTRIBUTION FROM THE WILSON ORNITHOLOGICAL SOCIETY CONSERVATION COMMITTEE. Wilson Bul. 70(4): 385-393. Dec. 1958.

Scott takes a hard look into the foreseeable future and gives a solid, documented picture of problems facing wildlife conservation in the U. S. Human population is ballooning. Demand for outdoor recreation is growing even more rapidly than the population. While we struggle to meet this demand, we increase the demand by stimulating interest in nature and conservation in every way we can. Federal lands are expected to remain at about the present acreage, but they will be used more intensively: timber stand improvement--removal of hardwoods--is one example. Marsh areas are being drained rapidly. Land prices and conflicts of interest may make purchase of refuges prohibitive. Certainly refuges should be acquired as soon and as fast as possible. We need not only big refuges, but many small, well-distributed neighborhood marshes and other refuges. Agriculture is becoming ever cleaner and more intensive. More pesticides are being used over larger areas. The amount of waste grain is being reduced. Wildlife depredations on crops will be of greater concern. Importance of wildlife as hosts for livestock diseases will be taken more seriously and we may need to guard against elimination programs. More and more land is being taken up by towns, factories, and highways. The huge acreages of utility rights-of-way have a wildlife potential we should explore carefully. Human pressure on parks will be so heavy that these areas may shelter nuisance species more than desirable wildlife. Reservoirs will be more numerous; this will have both good and bad aspects for wildlife. Pollution will increase unless rigorously attacked. We need widespread inventories of birdlife in areas of all types of land use. We need many more small management areas: "...wildlife conservation agencies are gambling with their future well-being when they concentrate all of their land purchasing resources in the so-called waste lands and fail to obtain small, evenly dispersed parcels of land throughout intensively cultivated areas."

Stebler, A. M. (Okla. State U., Stillwater.) RESEARCH AND MANAGEMENT IN WILDLIFE CONSERVATION. Proc. Okla. Acad. Sci. 38: 186-193. 1957 (1958).
Philosophical discussion of some of the biological bases of wildlife management.

Thamdrup, H. M., editor. THIRD CONGRESS OF THE INTERNATIONAL UNION OF GAME BIOLOGISTS. TRANSACTIONS. Danish Rev. Game Biol. (J. H. Schultz, Ltd., Copenhagen) 3(3): 1-166, illus. 1958.
The 3d Congress met at Aarhus, Denmark, in 1957. Many leading wildlife workers from several European countries delivered papers. The present extensive report on the Congress gives a general account of activities and attendance, then presents abstracts and discussion summaries for all papers. All general material and most abstracts are in English; some abstracts and discussions are in German. Most of the abstracts run 1-3 pages and are, with the discussions, factual and informative. These abstracts are:

Management and conservation of game birds in Britain, by A. D. Middleton.
A review of pheasant propagation methods in Great Britain, by Charles Coles.
Psychologische Probleme beim Aussetzen von Fasanen und Rebhühnern, by Harry Frank.
Some results of marking experiments on pheasants from a Danish estate (Kalø), by Knud Paludan.
Factors controlling brood size in the partridge (Perdix perdix) on an estate in South England, by T. H. Blank and J. S. Ash.
The problem of the short-term fluctuations in numbers of tetraonids in Europe, by L. Siivonen.
An investigation of the food of swans and ducks in Denmark, by R. Spärck.
A review of wildfowl research in Britain, by G. V. T. Matthews.
Co-operation in waterfowl research in northern and western Europe, by Pekka Grenquist.
Die Entwicklung der Grosstierbestände in den Kulturlandschaften Mitteleuropas im Verlauf der letzten 100 Jahre, by D. Müller-Using.
Mammal and bird pests on the land, by Harry V. Thompson.
Über den Transport des Wildes, by B. L. Jakšić.
Die Wiederentdeckung des mesopotamischen Damwildes, Cervus (Dama) dama mesopotamica Brooke, 1875, by Theodor Haltenorth.
Jagdliche Forschung auf Landschaftsbiologischer Grundlage, by Heinz Brüll.
Some studies on hare populations, by Johs. Andersen.
The organization and scope of game research in a number of European countries, by H. M. Thamdrup. [Long report: p. 73-90.]
Methods for estimating annual variations of game populations and hunters' bags in various European countries. [Long report, p. 91-123, by many authors. Based chiefly on replies to questionnaire.]
The red deer of the [Scottish] mountains, by G. Kenneth Whitehead.
Père David deer, by G. Kenneth Whitehead. [History, habits.]
Regulation of blood pressure in the red deer (Cervus elaphus L.), by Zbigniew Jaczewski and Janusz Gill. [p. 128-134, 9 figs.]
Capacity of the different parts of the digestive tract in the red deer (Cervus elaphus L.), by Janusz Gill and Zbigniew Jaczewski. [Incl. tables.]
Stomach contents of Danish red deer, by P. Valentin Jensen.
Das Rotwild Jugoslavijas, by Valentinčič Stane.
Untersuchungen an 460 zugrundegegangenen Rehen, by K. Borg.
Objektivisierte Qualitätsbewertung des polnischen Rehwildes (Capreolus capreolus), by Damazy J. Tilgner.
Sex equations in roedeer, by R. F. de Fremery.
Wildlife Research on the Huntington Wildlife Forest, by Wm. L. Webb.
Preventing game damage to crops by using impregnated cord, by J. A. Eygenraam.
Technische Schutzmassnahmen zur Verhütung von Rotwildschälschäden im Walde, by Erhard Ueckermann.
Symposium on deer problems. [2-p. summary of discussion.]

Wagar, J. V. K. (Colo. State U., Ft. Collins.) CAN WEAK-KNEED PUBLIC EDUCATION RETAIN RARE WILDLIFE VALUES? Trans. 23d N. Am. Wildl. Conf.: 526-530. 1958.

Today's press, advertising concerns--and even conservation agencies--indulge the masses, promote easy outdoor living, stress high hunter success, total kills, visitor numbers, and dollars spent. Little emphasis is given to vigorous wilderness experiences. Many agencies forget or ignore unusual species which dwindle while they publicize the response of ordinary creatures to management. To meet increasing demands for harvestable wildlife, we resort to artificial means--introduction of exotics, mechanization of habitat. Forgotten is Leopold's maxim that the enjoyment of wildlife is inverse to its artificiality. Needed is a restrictive certification and rigorous delineation of those privileged to enjoy unique wildlife values. Suggestions include examination of hunters to determine ability to distinguish legal species from rare, protected ones, and certification of only those who demonstrate ability to handle firearms safely and accurately.--R. A. Ryder.

WILDLIFE--HUNTING AREAS & PROBLEMS

Allen, Jack. (Ind. Dept. Cons.) NEWSOGRAM [FARMER-SPORTSMAN PLANS]. Outdoor Ind. 2(5): 19-20. Nov. 1958.

Pros and cons of the following plans for solving farmer-sportsman problems: Township or Neighborhood Plan, Texas Plan, Calif. Plan, Pa. Plan, Fla. Plan, Public Hunting Areas, Pay Shooting Areas. All have merit. None seems to solve problems completely. Answer may lie in statewide cooperative system in which landowners, sportsmen, and conservation agencies participate.--L. F. Stickel.

Kozicky, Edward L. (Olin Mathison Chem. Corp., E. Alton, Ill.) WILL THERE BE A TRANSITION FROM FREE PUBLIC HUNTING TO PAID SHOOTING? Proc. Soc. Am. For. Meeting 1957: 105-107. 1958.

As one reviews the fact that we have two billion acres in the continental United States, taking into consideration the present number of hunters and their projected increase in the next few decades, the only area that poses a problem with regards to transition from free to paid shooting is our farm game. In this area we have developed hunter management plans, such as the cooperative farmer-sportsmen plan, community hunting areas, public shooting areas, and recently shooting preserves. We can expect an increase in fee hunting for this group of game species. Hunting rights for migratory game will become more of a premium than they are at present. Choice sites for ducks and geese yield a financial return far greater than the agricultural crops planted thereon. However, such areas are extremely limited in number and acreage. Pass shooting of ducks on shooting preserves will serve to alleviate waterfowl hunting pressure on our wild species. Hunting opportunities for range and forest game do not appear to be in any major form of a transition from free to paid shooting. --Auth. summ.

Kozicky, Edward L. (Olin Mathieson Chem. Corp., E. Alton, Ill.) SHOOTING PRESERVES...PRIVATE ENTERPRISE IN GAME MANAGEMENT. Game Bird Breeders, Pheasant Fanciers, and Aviculturists' Gazette 8(2): 28-31, 68-69, 1 fig. Feb. 1959.

The industrial groups that sponsor shooting preserves do not consider preserves the sole answer to the problem of hunting pressure. They do consider preserves a valuable tool in attacking the problem around centers of human population. Will all hunting come to be of this type? Not to judge from Pa., where the system has been legal for many years. There paid and public shooting exist together without difficulty. Many people for whom other hunting is not possible are able to hunt on preserves. Results of a recent survey show that the preserve movement is growing very rapidly and attracting interest of general public. Figures are reported here. Pheasant is by far the most popular game, bobwhite is 2d, mallard is 3d, chukar is 4th; coturnix, turkeys, and pigeons are used only in small numbers. Total kill on preserves in 1957-8 was 772,723--120% over the kill in 1954-5. Do preserves provide "quality" shooting? Kozicky believes they do, insofar as they provide a normal, adult wild-type bird of natural behavior in natural cover. Many problems remain to be solved to gain the best

results, even from pheasants. This is even more true of the other species. Biologists should help the operators learn the facts and should guide the operators to means for quality hunting. States should adopt model laws for preserves and should assign biologists to assist, guide, and inspect preserve operations.

Philpott, G. W., W. E. Howard, and C. A. Graham. (1278 Arthur, Fresno, Calif.) A METHOD OF MANAGING SPORTSMEN ON RANGELAND. J. Range Mgt. 11(6): 290-292, 5 photos. Nov. 1958.

A permit-registration card to simplify the regulation of sportsmen access to private land and to improve farmer-sportsmen relations is described. Both sportsmen and landowners want the number of people present in an area at any one time to be limited and regulated. To test the effectiveness of the permits in regulating sportsmen access in a desirable manner, two permit quail hunts were conducted at the San Joaquin Experimental Range. The landowner's participation was kept to a minimum and the sportsmen managed the drawing of names and the hunting.--Auth. summ.

Titus, Harold. (Rt. 1, Traverse City, Mich.) MALLARDS AT RETAIL. Field & Stream 63(10): 56-57, 134-137, 4 photos. Feb. 1959.

Shooting mallards on commercial shooting preserves is growing rapidly in popularity. It is important for both state and preserve operator to see that the shooting grounds are well away from natural flight lanes of waterfowl, and that no wild birds are allowed to get mixed in with the propagated ones. Each bird should be marked, as by a web punch. If these precautions are not taken, commercial shooting of mallards may incur severe public resentment and may get into legal trouble with state and federal agencies.

WILDLIFE--INTRODUCTIONS

Carl, G. Clifford, and C. J. Guiguet. ALIEN ANIMALS IN BRITISH COLUMBIA. B. C. Prov. Mus. Handbook no. 14. 1-94 p., illus. Jan. 1958. 25¢, paper, from Prov. Mus., Victoria, B. C.

Discusses source and status of each of the many kinds of animals that have been introduced into B. C. or which have invaded recently. Only insects are excluded from consideration. Most species are handsomely illustrated by F. L. Beebe. Many of the introductions listed here failed, of course, but many succeeded. Mammals now established in the wild, at least on coastal islands, are: European rabbit, eastern cottontail, brown rat, black rat of 2 colorations, house mouse, fallow deer, and feral animals of several species. Birds now established in wild are: European gray partridge, chukar, Calif. quail, mtn. quail, pheasant, pigeon, skylark, starling, crested mynah, and house sparrow. Green frog and bull frog are also established, as are many kinds of fishes and invertebrates.

WILDLIFE--FOOD HABITS & TECHNIQUES

Arata, Andrew A. (U. Fla., Gainesville.) A QUICK METHOD FOR GROSS ANALYSIS OF MUSKRAT STOMACH CONTENTS. J. Wildl. Mgt. 23(1): 116-117. Jan. 1959.

Types of plant food items may be recognized in stomach contents on the basis of differential sedimentation following several washings.--Author.

WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Eadie, W. Robert. (Dept. Cons., Cornell U., Ithaca, N. Y.) TOXAPHENE - FOR CONTROL OF MEADOW MICE IN ORCHARDS. Farm Research 25(1): 15, 2 figs. Mar. 1959.

Toxaphene at rate of about 5 lbs. per acre was sprayed mechanically. Control of Microtus was good (90-100% reduction) where ground cover was light and mowed. Control was variable, down to 40 percent reduction, where cover was heavy and matted. Toxaphene is cheaper and less toxic than endrin and can be used for Microtus control where conditions are suitable.

Hayes, Wayland J., Jr., and Thomas B. Gaines. (US Pub. Health Serv., Savannah, Ga.) LABORATORY STUDIES OF FIVE ANTICOAGULANT RODENTICIDES. Pub. Health Rep. 74(2): 105-113, 2 figs. Feb. 1959.

A new laboratory method was devised for rapid evaluation of multiple-dose, slow-acting rodenticides with respect to required dosage, bait refusal, and speed and variability of action. With this method, it was found that, in general, wild Norway rats are most susceptible and roof rats least susceptible to each anticoagulant compound tested. Wild mice tend to resemble Norway rats in susceptibility, but they resemble roof rats in the high variability of response. The performance of warfarin was not excelled by the other anticoagulant compounds tested, although coumachlor, Diphacinone, and Pival were each about equal to warfarin against 1 or 2 species. PMP was distinctly inferior in performance. A short supply of animals prevented testing coumachlor against mice or Diphacinone against roof rats or mice.--Auth. summ.

Kalabukhov, N. I., and G. V. Kraivanov. SYSTEM OF MEASURES FOR RODENT CONTROL IN THE FOCUS OF TULAREMIA. Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii 1943(7/8): 59-66. Transl. 59-10070. 17 p. Order from Libr. Congress or SLA Transl. Center, 86 E. Randolph, Chicago, Ill. $2.40, microfilm; $3.30, photocopy. [From Tech. Transl. 1(2).]

"Various methods for mass destruction of rodents are discussed. Investigations were carried out for testing and selecting the most suitable method."

Newby, Fletcher E., and Robert L. Brown. (Mont. Game Dept.) A NEW PREDATOR MANAGEMENT PROGRAM FOR MONTANA. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 213-219. 1958.

"In summary, our approach to the problem of improving predator management will be through the combined effort of extension instruction and economic and ecological research. We believe that the extension approach will become an important supplement to existing methods of predator management. The usefulness of factual data accumulated through research already is apparent."

Spencer, Donald A. A FORMULATION FOR THE PROTECTION OF SEED FROM ANIMAL DAMAGE. Bur. Sport Fisheries & Wildlife, Denver 2, Colo. 1-4 p., mimeo. Feb. 1959.

Instructions for preparation of Endrin-Arasan mixture with adhesive and pigment. Sources of supply are listed.

WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Alberta. ANNUAL REPORT OF THE DEPARTMENT OF LANDS AND FORESTS...FOR THE YEAR ENDED MARCH 31ST 1958. Queen's Printer, Edmonton. 108 p., illus. 1959.

A brief general report of Fish and Game Administration occupies p. 58-68. It includes a table showing numbers of fur animals trapped during the year. Trapping in the province is gradually falling off owing to low price of pelts and improved economic condition of the people. The year 1957-58 was excellent for wildlife, with all forms doing well and most forms, especially upland game birds, making considerable increase.

Allen, John M. (Ind. Dept. Cons.) 1956 DIVIDEND TO WILDLIFE STOCKHOLDERS. Outdoor Ind. 1(2): 24-27. Aug. 1957.

Estimated Ind. hunting kill for principal game species in 1941, 1946, 1955, and 1956 is shown in table; trends are discussed. Data were from questionnaires to sportsmen. Rabbits, quail, and pheasant were on upswing in 1957. Raccoons were down because of distemper. Squirrel kill in 1956 was high because of good mast crop. Waterfowl harvest was down somewhat because peak migration passed w. of Ind. Fox kill was down. In 1956, 674,000 sportsmen purchased combination hunting and fishing licenses and took an estimated 3,403 tons of dressed wild game.--L. F. Stickel.

Gabrielson, Ira N. (Wildl. Mgt. Inst., Wire Bldg., Wash. 5, D. C.) THE GABRIELSON REPORT. Colo. Outdoors 8(2): 1-10, 2 photos. Mar.-Apr. 1959.

Recommendations for changes in organization and functions of the Colo. Game and Fish Dept. Based on Wildl. Mgt. Inst. analysis requested by the Commission.

New Hampshire. BIENNIAL REPORT OF THE DEPARTMENT OF FISH AND GAME, JULY 1, 1956 TO JUNE 30, 1958. 64 unnumbered p., illus. 1958?

Interesting, attractive report designed primarily for public. It does include tables showing deer kills and sex ratios in each county in both years of the biennium, and tables of fur take, by species, for both years. Text gives data on birds propagated on game farms and released, and on snowshoe hares purchased and released in s. part of state. PR projects are described.

Saskatchewan. ANNUAL REPORT OF THE DEPARTMENT OF NATURAL RESOURCES...FOR THE FISCAL YEAR ENDED MARCH 31, 1958. Queen's Printer, Regina. xii + 130 p., 56 figs. 1958.

Report of Wildlife Branch, p. 27-52, gives general picture of activities and summarizes survey data on status of game species. Reference data are presented in tables on: economic study of hunter expenditures, 1956; crop acreage and estimated kill under duck depredation permits, 1957; numbers and values of wild pelts taken, by species, 1956-8; numbers of pelts taken, by species, each year 1947-58; reported kills of game birds, by species, during the year; and reported kills of big game, by species, during year.

Seaton, Fred A. 1958 ANNUAL REPORT, SECRETARY OF THE INTERIOR. US Govt. Printing Office, Wash., D. C. xliv + 404 p., illus. Jan. 1959. $1.50, paper, from Supt. Documents.

A report to and for the public on the programs and accomplishments of all agencies of the Department. Here one can get a quick and generally impressive picture of what was being done by Reclamation, Geological Survey, Indian Affairs, Park Service, Fish & Wildlife, and many other bureaus.

WETLANDS & WILDLIFE

Ball, Edwin W. RESULTS IN APPLYING DALAPON BY AIRCRAFT TO PEST PLANTS IN WATERFOWL AREAS OF THE SOUTHEAST. Down to Earth 14(1): 11-14, illus. 1958. [From Biol. Abst. 33(4).]

In 1954-57 applications of dalapon (2:2-dichloropropionic acid) were made by airplane and as sprays to aquatic areas in Fla., N. C. and La., using 10-20 lbs. per acre. Water levels varied from 2 in. to 2.5 ft. In some of the trials 2,4-D and 2,4,5-T were added to the dalapon. Most treatments, made in the spring, reduced cattail populations to less than 10% of that in the check plots the 1st year and less than half in the 2d year. The 10-lb. per acre rate was almost as effective as the 20-lb. treatment. Panicum hemitomum was similarly controlled under some conditions. Treatments were not effective against Zizaniopsis miliacea. Following treatment, a number of plots were rather promptly invaded by dense stands of species furnishing good food for waterfowl --e.g., Echinochloa spp., Setaria magna, Panicum dichotomiflorum, Eleocharis spp. and Scirpus spp.--V. R. Gardner.

Beadle, Leslie D., and Fred C. Harmston. (US Pub. Health Serv., Atlanta, Ga.) MOSQUITOES IN SEWAGE STABILIZATION PONDS IN THE DAKOTAS. Mosquito News 18(4): 293-296, 6 photos. Dec. 1958.

Sewage lagoons, useful to wildlife, also breed mosquitoes. Of 26 ponds inspected, 8 had no mosquitoes and 18 had Culex tarsalis; 8 of them had heavy populations. All ponds that had mosquitoes also had vegetation. Ponds that had few or no mosquitoes also had little or no vegetation. Recommendations are for steep-sided ponds that have depth of at least 4 ft. in mosquito-breeding season, for elimination of vegetation, and for use of larvacides. Nothing is said about wildlife values or effects.

Conover, John Townsend. SEASONAL GROWTH OF BENTHIC MARINE PLANTS AS RELATED TO AN ESTUARINE ENVIRONMENT. Ph.D. thesis, U. Mich. 209 p. 1958. [From abstract in Dissertation Abstracts 19(6).]

"Comparisons were made between the growth of 70 common benthic marine plants and seasonal fluctuations in insolation, temperature, salinity, tidal currents, wave action, sedimentation, dissolved oxygen, pH, titration alkalinity, phosphorus and nitrogen, contamination by epiphytes and animal grazing. Also considered were the effects of abnormally low temperatures, icing and hurricanes."

Foster, Charles H. W. (5 Vane St., Wellesley, Mass.) OUR WETLAND FUTURE: PROSPECTS AND PITFALLS. Mass Aud. 43(3): 115-119. Jan.-Feb. 1959.

The wetlands that are disappearing so rapidly in Mass. have important and proven values. These lands have been surveyed and mapped by wildlife agencies. Interested organizations have come together in a Mass. Wetland Committee. Technical assistance has been made available. But not 1 new marsh has been put under better management as a result of the program. What is needed? For one thing, we need a new survey that would consider all values (not just wildlife) and would be made with local interests in mind. We need to know much more about how to manage the Mass. marsh types. The many existing organizations should be organized into a working wetland movement; local groups should be formed. The greatest need of all, however, is for leadership that will get action while a major part of the resource is still available.

Greeley, John R. (N. Y. Cons. Dept.) BATTLE REPORT ON WATER CHESTNUT. N. Y. State Cons. 13(4): 32-33, 5 figs. Feb.-Mar. 1959.

Fairly successful war is being waged against small, scattered colonies of waterchestnut in N. Y., but vast, solid fields still clog the lower Mohawk and Hudson rivers. Research has shown that spraying with 2,4-D is not effective enough, unless it is timed exactly right. Much better is 2,4-D in pellets or vermiculite. These vehicles take the chemical to the bottom where roots take it up. Present clay pellets release 2,4-D too slowly. Faster-acting type of pellet is being recommended to producers. Present methods are good enough to justify all-out attack on this dangerous weed--to limit of available funds. Appeal is made to landowners, boaters, sportsmen and others to help in the campaign.

Janzen, D. H. (Director, Bur. Sport Fisheries & Wildl., Wash. 25, D. C.) TODAY'S OPPORTUNITIES FOR CONSERVATION IN WATER DEVELOPMENT. Trans. 23d N. Am. Wildl. Conf.: 21-27. 1958.

Kimball, James W. (Minn. Dept. Cons.) TO BUY OR NOT TO BUY - WITH THE $3 DUCK STAMP. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 68-71. 1958.

"In summary, it is believed that the acquisition of entire farms for the purpose of saving the wetlands is not economically feasible and the purchase of numerous small potholes on individual farms is impractical, if not impossible. This would appear to leave but one approach: A program which will leave the wetlands in private ownership but, through some form of lease or rental agreement, simply prevent them from being drained and maintain them in their present state."

Loveless, Charles M. (Fla. Game Comm.) A STUDY OF THE VEGETATION IN THE FLORIDA EVERGLADES. Ecology 40(1): 1-9, 7 figs. Jan. 1959.

Describes the various plant communities and discusses effects of fire and drought. Also considered are theories of origin of tree islands, and the importance of alligator holes to animal life. Major plant communities are, in order of prevalence: sawgrass marsh, wet prairie, slough, and tree islands. Natural fire has always been a dominant factor and much of the vegetation is relatively fire tolerant. Recently, however, fire has been all too common and severe as a result of lowered water levels. "This has resulted in altering or completely destroying many tree island communities, changing the composition of other plant communities, and has resulted in the loss of organic soils."

Neely, Wm. W. (Soil Cons. Serv., P. O. Box 493, Walterboro, S. C.) IRREVERSIBLE DRAINAGE--A NEW FACTOR IN WATERFOWL MANAGEMENT. Trans. 23d N. Am. Wildl. Conf.: 342-348. 1958.

A generally unrecognized condition that exists in many coastal marshes places limitations upon their development for wildlife, pasture, or cropland. It is the presence of sulfides in the soil. When such soils (cat clays) are drained and dried, the sulfides oxidize to sulfates and sulfuric acid. The resulting pH of the soil becomes too low to grow any useful plants. Such enormous amounts of lime would be required to correct this condition as to be beyond feasibility. Agricultural development and use of soils that contain sulfides appear limited to a rice-type of culture. The same limitation applies

to growing duck foods which simulate this type of culture by not requiring deep drainage or prolonged drying of the field. When either fresh or brackish water is impounded on many of the previously drained and dried coastal marshes, the pH of the water rapidly drops to 2.0-3.0. It is then toxic to most forms of aquatic life.--Author.

Pelgen, David E. (Calif. Dept. Game, Sacramento.) RECREATION, FISH, AND WILDLIFE IN CALIFORNIA'S WATER DEVELOPMENT PROGRAM. Trans. 23d N. Am. Wildl. Conf.: 228-234. 1958.

Calif. is working out a long-range plan for complete utilization of its water supplies. Surplus water from various parts of the state will be moved to other parts by a great system of canals. Numerous reservoirs and control structures will be built. Damage to fisheries, wildlife, and recreational values could be great--some damage is certain. However, fisheries, wildlife, and parks men are detailed to the Dept. of Water Resources while remaining part of their own agencies. They participate in early planning and detailed planning of all projects. Much good already has been done in getting agreement on such matters as minimum stream flow and creation of recreational impoundments. One big problem is that the gross-expenditure method of appraising wildlife values is not compatible with the net-return systems used for other economic values involved. "If recreation is to become a project purpose, it must be reduced to dollar terms so that it can be compared equitably with other project benefits and costs."

Robertson, Wm. B., Jr. (Everglades Natl. Park, Homestead, Fla.) A SURVEY OF THE EFFECTS OF FIRE IN EVERGLADES NATIONAL PARK. US Dept. Int., Natl. Park Serv. 169 p., mimeo. 1953. [Cited by C. M. Loveless, Ecology 40(1).]

Stotts, V. D. (Box 44, Stevensville, Md.) OFFSHORE DUCK BLINDS: THEIR USE BY WILDLIFE AND HOW TO IMPROVE THEM FOR WILDLIFE USE. Md. Cons. 36(1): 23-26. Jan. 1959.

There are hundreds of offshore duck blinds in the Chesapeake Bay area. Many are large and have roofs. Nesting in or on these blinds are black ducks, mallards, ospreys, purple grackles, green herons, barn swallows, and barn owls. Most of these often nest at once in the same blind. Less frequent nesters on blinds are English sparrows, starlings, and purple martins. The martins, surprisingly, nested in open, abandoned grackle nests. Presence of ospreys seems to protect duck nests from crow predation. Raccoons use blinds as dens and feeding stations; they are, of course, destructive to birds. Ducks nest on blinds most often when adjacent shore is developed or otherwise unsuitable for them. Blinds made with red cedar brush are most favorable, apparently because of the way it holds up. Roofed blinds are best, for nesting on roofs is common. To improve blinds for wildlife, put them as far from shore as feasible and legal in the locality, and do not leave board walks out to them. Remove brushing from sides to deter blackbird nesting. Encourage owls by removing door and propping it against inside of blind to provide darkened recess. Other improvements are mentioned.

Vinberg, G. G. TOXIC PHYTOPLANKTON. Uspekhi Sovremennor Biologii (Moscow) 38, 2(5): 216-226. 1954. TRANSLATION no. 12, Gulf Fishery Investigations Library, US F&WS, Galveston, Texas. [From US Dept. Int. Libr. List of Accessions, no. 116.]

FARMLAND & WILDLIFE

Eakin, James H. (Pa. State U., U. Park.) BIRDSFOOT TREFOIL AT THE WHITE DEER ROD AND GUN CLUB. Pa. Game News 30(3): 38-40, 1 photo. Mar. 1959.

Birdsfoot trefoil of the Empire and European varieties has been highly successful at this club near U. Park, Pa. Plantings started in 1951 are still very good and should be good in 1970 if given a little lime and fertilizer. Trefoil is something like alfalfa but succeeds where alfalfa fails. A 3-year-old plant may have more than 400 stems. Two plants per sq. ft. furnish a lot of game feed. Trefoil remains green and in bloom all summer, need not be clipped to keep it tender. This legume turns old poverty-grass fields into

beautiful legume fields. Deer graze the plant almost constantly. Rabbit population tripled after use of trefoil. Plantings may produce over 100 lbs. of seed per acre for birds, and also are good bird cover. Instructions for growing trefoil are detailed. In the long run, this plant takes little trouble and expense.

Haugen, Arnold O., and Daniel W. Speake. (Iowa State Coll., Ames.) FERTILIZATION OF MULTIFLORA ROSE. Wildl. in N. C. 23(2): 8, 1 photo. Feb. 1959.
Some multiflora plantings on poor soil on Piedmont of e.-cent. Ala. refused to prosper despite usual fertilization. On advice of expert, applications of 3 lbs. of 6-8-4 per 100 ft. of row were made each month from April to July. Highly satisfactory response was obtained, with aid of favorable weather. "These results suggest that systematic monthly applications of fertilizer are necessary for adequate growth of multiflora rose, especially when planted on poor soils such as eroded spots of the Piedmont."

Heidelbauer, Frank. (Iowa Cons. Comm., Des Moines.) SOIL BANK PROMOTION. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 35-39. 1958.

Koenings, Roman. (Wis. Cons. Dept., Madison.) SOIL BANK IN WISCONSIN AT THE PRESENT, AND FUTURE NEEDS AND POSSIBILITIES. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 24-29. 1958.

Morgan, Robert L. (N. Dak. Game Dept.) PROGRESS AND FUTURE ASPECTS OF THE SOIL BANK PROGRAM IN NORTH DAKOTA. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 39-43. 1958.

Olds, Hayden. (Ohio Dept. Nat. Resources, Columbus.) WILDLIFE ASPECTS OF THE 1958 SOIL BANK PROGRAM IN OHIO. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 20-24. 1958.

Rudasill, L. S. (Md. Dept. Game.) THE TRACTOR FLUSHING BAR / WE HAVE ONE THE FARMERS WILL USE! Md. Cons. 36(1): 3-4, 2 figs. Jan. 1959.
Discusses and illustrates new type of flushing bar that can be built from used material for about $1.50. Flushing is done by lengths of old tire chain suspended from the bar by wires. Apparently the bar is able to swing backward or forward when it strikes obstacles.

Schrader, Thomas A. (Dept. Agr., Wash., D. C.) [SOIL BANK AND WILDLIFE--VIEWS OF THE DEPARTMENT OF AGRICULTURE'S SPECIALIST ON THE SUBJECT.] Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 44-49. 1958.

Swanson, Carl V., and Charles F. Yocom. (Wash. Game Dept., Seattle.) UPLAND GAME-BIRD POPULATIONS IN RELATION TO COVER AND AGRICULTURE IN SOUTHEASTERN WASHINGTON. Trans. 23d N. Am. Wildl. Conf.: 277-290, 4 figs. 1958.
Spring and fall population counts of pheasants, huns, and quail are presented for 2 study plots in se. Wash. for the years 1940-54. These figures represent the longest series of upland game inventories for the state. They are from an area where tremendous changes have occurred in agricultural practices during the period. A detailed discussion of farming practices is presented to clarify some of the erroneous and widespread ideas relative to alternate year farming. The importance of land valuation in relation to upland game numbers is stressed. "It is axiomatic that land is farmed more intensively as its value increases." On the Colton plot, reductions in permanent cover, fence lines and stubble have been of such magnitude that the apparent spring population level of pheasants has declined from 300 birds to about 200 birds. On the Pullman plot, the spring carrying capacity for huns has declined from 100 birds to 1 to 10 birds in the 15 year period. Discussion, maps, and graphs illustrate this decline.--C. V. Swanson.

Wells, Ray M. (Mo. Cons. Comm., Jefferson City.) WILDLIFE AND THE SOIL BANK IN MISSOURI. Proc. 25th Ann. Meeting Assn. Midwest Fish & Game Comms.: 30-35. 1958.

Williams, D. A. (Administrator, Soil Cons. Serv., Wash. 25, D. C.) TODAY'S OPPORTUNITIES FOR CONSERVATION IN AGRICULTURAL DEVELOPMENT. Trans. 23d N. Am. Wildl. Conf.: 5-12. 1958.

Wilson, H. Leo. (Soil Cons. Serv., Casper, Wyo.) WILDLIFE BENEFIT FROM CONTROLLED BURNING. Soil Cons. 24(9): 210-211. Apr. 1959.
The Bighorn Basin Wildlife Club, Wyo., wanted to do something to increase the supply of upland game birds. Food did not seem scarce, but cover was being destroyed wholesale by spread of fires used to clear ditch and canal banks every spring. The club organized and equipped itself to do the necessary burning without letting fire spread to adjacent cover. Members saved a large acreage of nesting cover in agricultural areas. Incidental benefits were increased public interest in wildlife conservation, and growth of club membership. The club also has other constructive projects.

RANGELAND & WILDLIFE

Cronemiller, Fred P. (US For. Serv., San Francisco.) THE LIFE HISTORY OF DEERBRUSH--A FIRE TYPE. J. Range Mgt. 12(1): 21-25, 6 photos. Jan. 1959.

Dix, Ralph L. (Marquette U., Milwaukee, Wis.) THE INFLUENCE OF GRAZING ON THE THIN-SOIL PRAIRIES OF WISCONSIN. Ecology 40(1): 36-49, 5 figs. Jan. 1959.
Susceptibility to grazing was determined for 78 species, and from these data whole stands were rated as to susceptibility and as to their degree of deterioration. "The use of grazing susceptibility numbers to determine stand condition is thought to have certain advantages over methods which estimate stand condition by determinations of the residue of the 'climax composition' remaining in a grazed stand."

Evans, R. A., and M. B. Jones. (U. Calif., Davis.) PLANT HEIGHT TIMES GROUND COVER VERSUS CLIPPED SAMPLES FOR ESTIMATING FORAGE PRODUCTION. Agron. J. 50(9): 504-506. Sept. 1958. [From J. Range Mgt. 12(1).]

Hamilton, J. W. CHEMICAL COMPOSITION OF CERTAIN NATIVE FORAGE PLANTS. Wyo. Agr. Exp. Sta. (Laramie), Bul. no. 356. 44 p., illus. 1958. [From J. For. 57(3).]

Hancock, Norman V., and Clark D. Davis. (Utah Dept. Game.) UTAH'S RANGE REHABILITATION PROGRAM. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 190-193. 1958.
Large areas of Utah were virtually ruined by overuse by livestock and game. Herd control alone is not enough to bring them back. Control of poor plants and planting of good ones is needed, but we also need more knowledge of how to do these things. Browse species that show promise for planting are bitterbrush, fourwing saltbush, curlleaf and true mahoganies, big sage, cliffrose, and big rabbitbrush. Outstanding planting methods have been drilling in furrows made by the Hansen Deep Furrower and broadcasting seed followed by discing with a cutout disc. Rodent damage, frost damage, and competition from cheat grass are problems. Frost-resistant strains are being sought. Much of the existing browse is being choked out by invasion of piñon-juniper. Piñon and juniper plants are attacked selectively by bulldozer with tilting blade (hula). Where valuable plants are not mixed in, they are attacked by cabling. One promising technique is to broadcast seed before juniper eradication; any activity associated with tree removal tends to cover seed. Grass and browse seedlings have been observed under dead trees. It is also good to plant seed mixture in pits where trees came out.

Lehmann, V. W. (629 W. Lee, Kingsville, Tex.) GAME CONSERVATION AND MANAGEMENT [ON THE KING RANCH]. p. 761-766 in "The King Ranch," by Tom Lea. Little, Brown & Co., Boston & Toronto. 2 vols., 838 p., illus. 1957.
About 1912, when game had become scarce in s. Texas, the King Ranch adopted highly protective restrictions. Later it took up other forms of wildlife management and hired the author of this paper as wildlife specialist. Water was made available to wildlife by special devices. Shelterbelts were planted

and fenced. Intensive predator control was maintained. Bobwhite cover was improved by half-cutting shrubs on sandy semi-prairie; elsewhere, about 500 brush shelters were built for quail. Rows of prickly pear cactus provided cover along fences and also provided emergency cattle feed after spines were burned off. Miles of combination food strips and fire guards were disced. Some artificial feeding was done during drought. Various research studies were made by visiting biologists. Heavy quail populations were obtained: 1 quail per 2 acres in winter over considerable areas, except in dry years. Drought caused death of 90% of all quail from nutritional deficiencies in 60 days, and mortality of other game was heavy. Deer reached peak densities of 1 to 4.6 acres of oak brushland and 1 to 12 acres of mesquite. Turkey populations were similar. Javelina populations were hard to determine. In 1949, a harvest of 1/2 the deer and 2/3 of the turkeys would have given yield of more than 1/2 the theoretical production of veal. On oak range, management might more economically be for deer than cattle. New legislation is needed, however, to permit adequate wildlife harvest. [Effect of wholesale brush control, discussed elsewhere in the volume, is not revealed in this article.]

Riordan, Laurence E. (Colo. Game Dept., Denver.) DIFFERENCES IN RANGE VEGETATION RESULTING FROM GRAZING BY DEER, CATTLE, AND SHEEP. Proc. Soc. Am. For. Meeting 1957: 147-151. 1958.

Results of experiment involving known numbers of cattle, deer, and sheep in 9 fenced pastures of piñon-juniper type. "Principal observations were that sheep utilize forbs to a greater extent than any other class of vegetation, but make appreciable use of grasses and browse. Cattle utilize grass species more than any other class of vegetation. Winter deer browsing is confined almost exclusively to browse species with utilization of mountain-mahogany under heavy stocking equalling 79 percent over the three years from 1954 through 1957. When deer in winter and livestock in spring and fall are stocked at moderate rates on the same area, there apparently have been no more detrimental effects on the various classes of vegetation than when grazing was by livestock alone."

Schmutz, Ervin M., Dwight R. Cable, and John J. Warwick. (U. Ariz., Tucson.) EFFECTS OF SHRUB REMOVAL ON THE VEGETATION OF A SEMIDESERT GRASS-SHRUB RANGE. J. Range Mgt. 12(1): 34-37, 2 photos. Jan. 1959.

An area 20 mi. sw. of Tucson, Ariz. was chained. Results were studied 2.5 years later. Old plants of jumping cholla cactus were 73% reduced, but young cholla were greatly increased and promised to form a stand denser than the original. Neither native nor seeded grasses nor forbs benefited from the treatment.

Shelford, V. E., and G. S. Winterringer. (U. of Ill., Urbana.) THE DISAPPEARANCE OF AN AREA OF PRAIRIE IN THE COOK COUNTY, ILLINOIS, FOREST PRESERVE DISTRICT. Am. Midl. Nat. 61(1): 89-95, 3 figs. Jan. 1959.

"The invasion of the prairie has taken place in two main ways: (a) by scattered growth of trees and shrubs in the grass area, and (b) by invasion of the grass by the edge organisms." Factors involved in perpetuation or overgrowing of prairie are discussed.

Webb, Edward L. (Ariz. Game Dept.) WATER DEVELOPMENT EVALUATION. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 251-255. 1958.

Ariz. now uses rainwater catchments (guzzlers) that hold 2,500 gallons and can be used by big game as well as small game. The state now has 219 guzzlers. These are expensive and it is essential to know if they increase game. Campbell in N. M. found that they did not. Gullion in Nev. found that they did [as earlier workers found in Calif.]. Analysis of Ariz. data as reported here proves that Gambel's quail and other wildlife do use the watering devices heavily, but fails to prove whether or not water supplies increase populations. On this crucial point the data are inadequate, especially because pre-guzzler figures are weak, but also because supposed increases around guzzlers parallel statewide trends, and because the increases have not been well sustained. Hard-nosed, long-range experiments to settle the question are under way: 2 experimental areas that have plenty of water supplies will be given population study for 2 years, then all water will be closed to game for 3 years, then water will be made available on 1 of the areas during 3 more years of study. Thus in about 8 years Ariz. should know for sure whether guzzlers are worth while, at least on areas like those of the experiment.

FORESTLAND--FORESTRY & ECOLOGY

Ahlgren, Clifford E. (Wilderness Res. Center, Ely, Minn.) SOME EFFECTS OF FIRE ON FOREST REPRODUCTION IN NORTHEASTERN MINNESOTA. J. For. 57(3): 194-200, 3 graphs. Mar. 1959.

Biswell, H. H. (U. Calif., Berkeley.) PRESCRIBED BURNING IN GEORGIA AND CALIFORNIA COMPARED. J. Range Mgt. 11(6): 293-297, 4 figs. Nov. 1958.
Mainly a serious consideration of the values and techniques of burning in Calif. and of exploratory work that has been done there.

Brown, Bruce Antone. INTERRELATIONSHIP OF BRUSH POPULATIONS AND SOME SITE FACTORS IN JACK PINE STANDS OF NORTH CENTRAL MINNESOTA. Ph.D. thesis, U. Minn. 123 p. 1958. [From abstract in Dissertation Abstracts 19(8).]

Cox, Donald David. SOME POSTGLACIAL FORESTS IN CENTRAL AND EASTERN NEW YORK STATE AS DETERMINED BY THE METHOD OF POLLEN ANALYSIS. Ph.D. thesis, Syracuse U. 144 p. 1958. [From abstract in Dissertation Abstracts 19(8).]

Laessle, Albert M. (U. Fla., Gainesville.) A REPORT ON SUCCESSION STUDIES OF SELECTED PLANT COMMUNITIES ON THE UNIVERSITY OF FLORIDA CONSERVATION RESERVE, WELAKA, FLORIDA. Quart. J. Fla. Acad. Sci. 21(1): 101-112. 1958. [From Biol. Abst. 33(2).]
Permanent quadrats unburned for over 20 years showed marked differences in various sites in the rate of succession of hardwood species. Increment borings showed that the largest laurel-oaks were approximately the same age as the time since the last fire. Formerly dominant species were not reproducing appreciably in any quadrats. On the basis of continued fire protection it is concluded that: (1) The rate of succession will accelerate with time. (2) That the sharp ecotones formerly present in fire climax communities will become broader and more poorly defined as the mesophytic hardwood climax is approached.--Author.

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Barick, Frank B. (N. C. Wildl. Resources Comm., Raleigh.) THE FUTURE ROLE OF THE STATES IN FOREST-WILDLIFE MANAGEMENT. Proc. Soc. Am. For. Meeting 1957: 95-96. 1958.

Baskett, T. S., R. L. Dunkeson, and S. C. Martin. (U. Mo., Columbia.) TEN-YEAR TIMBER-CUTTING CYCLE PROVIDES A CONTINUING SUPPLY OF FORAGE. US For. Serv., Central States For. Exp. Sta. (Columbus, Ohio), Sta. Note no. 125. 2 p., 4 graphs. Dec. 1958.
Ten-year cutting cycle in Mo. oak forest creates many small openings. Grasses and herbs predominate in these for first few years, then shrubs and vines, and finally, in latter part of 10-year period, tree reproduction prevails. Throughout the period, the amount of forage for deer is increased.

Biswell, H. H. (U. Calif., Berkeley.) THE USE OF FIRE IN CALIFORNIA CHAPARRAL FOR GAME HABITAT IMPROVEMENT. Proc. Soc. Am. For. Meeting 1957: 151-155, 2 figs. 1958.
Chaparral w. of the Sierra can be divided into 3 arbitrary types: true chaparral, woodland-grass chaparral, and timberland chaparral. These vary from spot to spot, depending on local factors. Fire has been used at selected sites in each type to improve game conditions. Burning techniques are described for each type. Edge has been created. Browse and forage have been improved in quantity and quality. Deer and other game have responded well. Hunting has been made easier, wildfire hazard has been cut, and flow of some springs has increased.

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) FUTURE ROLE OF FEDERAL AGENCIES IN FOREST-WILDLIFE MANAGEMENT. Proc. Soc. Am. For. Meeting 1957: 97-100. 1958.

Davison, Verne E. (US Soil Cons. Serv., Athens, Ga.) PINE TREES AND WILDLIFE. Va. Wildl. 20(3): 10-12, 1 photo. Mar. 1959.

It is true that dense stands of young pine are not good wildlife habitat, but these stands become more open and diversified when cutting begins. Many sites will never be in pine at all, and many pine lands will never be in pure pine. Scrub hardwoods are not very valuable to game. It is cheaper to put up nest boxes than to tolerate den trees. The combination of managed woodlands and managed farmland will not mean the end of wildlife nor the end of outdoor enjoyment. Publicly owned forests are managed with wildlife in mind. Private forests can be managed for wildlife just as far as the owner desires. The Soil Cons. Serv. and other agencies stand ready to advise owners how to adjust their silvicultural practices for the kind and amount of wildlife they want in their managed forests.

Duncan, Don A., and Louie B. Whitaker. REPELLENTS REDUCE CATTLE BROWSING ON PINES. U. S. For. Serv., S. For. Exp. Sta. (New Orleans 13, La.), S. For. Notes no. 119: 2-3. Jan. 1959.

"Two recent tests in central Louisiana, planned in cooperation with the U. S. Fish and Wildlife Service, have shown that several chemicals are effective in reducing cattle browsing of planted slash pines. The most promising are ZAC, a zinc compound; TMTD, a thiram compound; ZIP, a commercial rabbit and deer repellent which contains 30 percent ZAC; and a mixture of copper carbonate and asphalt emulsion." Some details of tests and findings are supplied.

Greeley, A. W. (Reg. Forester, US For. Serv., Milwaukee, Wis.) TODAY'S OPPORTUNITIES FOR CONSERVATION IN FORESTS, PARKS, AND WILDERNESS. Trans. 23d N. Am. Wildl. Conf.: 14-20. 1958.

Jokela, J. J., and Ralph W. Lorenz. (U. of Ill. Agr. Exp. Sta., Urbana.) MOUSE INJURY TO FOREST PLANTING IN THE PRAIRIE REGION OF ILLINOIS. J. For. 57 (1): 21-25. Jan. 1959.

Cottontail rabbits and meadow mice (M. ochrogaster) have been the main factors limiting early success of tree plantations in cent. Ill. Damage as observed for 10 years is reported. Data relating to incidence and effects of damage during winters of 1951-2 and 1952-3 are presented. Ash, cottonwood, Douglas-fir, larch, Osage-orange, yellow-poplar, and southern pines (except loblolly) were severely injured at 1 or both locations studied. Injury during first winter usually was fatal. Older pines died if more than 75% girdled. Established hardwoods usually sprouted multiple stems after mouse damage. Growth reduction varied with degree of injury, but was greatest in first season after injury. Clean cultivation lessens mouse damage if kept up long enough, but is costly and often impracticable. Poisoning should be applied before cold weather to be effective.--From auth. summ.

Lawrence, Wm. H. (Weyerhaeuser Timber Co., For. Res. Center, Centralia, Wash.) WILDLIFE-DAMAGE CONTROL PROBLEMS ON PACIFIC NORTHWEST TREE FARMS. Trans. 23d N. Am. Wildl. Conf.: 146-151, 1 fig. 1958.

Focuses attention on severity of problems associated with regenerating Douglas-fir stands. Presents estimates of annual losses sustained by different classes of growing stock on Weyerhaeuser Timber Co. tree farm. These losses total $875,000 annually. Discusses progress being made in developing wildlife repellents for protection of broadcast Douglas-fir seed and plantations. Endrin-Arasan coating for seed is effective in reducing seed destruction by mice. Search is continuing for a systemic repellent to protect planted seedlings. Stresses the need for better understanding of ecology of problem animals so biological controls may be employed.--Author.

Pase, Charles P., and Richard M. Hurd. (2506 Prairie Ave., Rapid City, S. Dak.) UNDERSTORY VEGETATION AS RELATED TO BASAL AREA, CROWN COVER AND LITTER PRODUCED BY IMMATURE PONDEROSA PINE STANDS IN THE BLACK HILLS. Proc. Soc. Am. For. Meeting 1957: 156-158, 1 fig. 1958.

The production of both herbaceous and shrubby vegetation increases as pine stands become more open. This suggests that thinning to and beyond accepted silvicultural standards may be one way to improve browse production on important deer winter ranges.

Reid, Vincent H., and Phil D. Goodrum. (US F&WS, 206 Forestry Bldg., Colo. State U., Ft. Collins.) THE EFFECT OF HARDWOOD REMOVAL ON WILDLIFE. Proc. Soc. Am. For. Meeting 1957: 141-147, 2 figs. 1958.

Acorns are a wildlife food of good nutritional quality for 4 important game species: deer, squirrels, turkey and quail. They furnish a good concentrate in fall and winter when other food plants in s. pine lands are nutritionally low. In s. pine forests, where snow cover is no problem, acorns are readily used over long periods each year. Oak mast has been recorded as used from Sept. to May by some species of wildlife and almost year around by others. An 8-year study indicates that acorns are a staple food used every year by bobwhites. In addition to the food they offer, oaks add brushy cover and diversity to s. pine forests to make them a more favorable wildlife habitat. The wildlife potentiality and carrying capacity of s. pine forests is increased by the presence of oaks. If there is interest in including game management in the intensive pine management of the South, then there is a challenge to keep some quality mast-bearing oaks in the forest. If lumbering takes out the big trees, and stand improvement calls for removal of undesirable oaks, large and small, then little is left to produce oak mast now or in the future. Suggestions are given for leaving reasonable numbers of oaks. A compilation is presented on proximate chemical analysis of many kinds of acorns.

Smith, Robert Leo. (W. Va. U., Morgantown.) CONIFER PLANTATIONS AND WILDLIFE. PART I. N. Y. State Cons. 13(4): 18-20, 36, 6 photos. Feb.-Mar. 1959.

First of 2 semitechnical articles based on author's doctoral study. For author's informative abstract of technical publication on this work, see WR 94 p. 30.

Turček, F. J. (For. Res. Inst., Banská Štiavnica, Czechoslovakia.) QUANTITATIVE EXPERIMENTS ON THE CONSUMPTION OF TREE-SEEDS BY MICE OF THE SPECIES APODEMUS FLAVICOLLIS. Arch. Soc. Zool. Bot. Fennicae "Vanamo" 10(1): 50-59, illus. 1956. [From Biol. Abst. 33(2).]

Under laboratory conditions 7 mice were investigated for about 8 months. An average of 84% of dry matter consumed was assimilated, but only 5% food was used for storage and growth. On the basis of food selection experiments, where 10,382 seeds of 15 plant species were given to mice, the following order of preference was obtained: Picea, Fagus (most preferred); Prumus, Quercus, Fraxinus, Robinia, Larix (neither preferred nor rejected); Tilia, Cornus, Rosa (moderately rejected); Berberis, Viburnum, Abies, Juniperus, Ailanthus (strongly rejected). When fed with acorns, mice showed preference for gnawing at the basal end. Such partially damaged acorns can still germinate. It is concluded that both quality and quantity of seeds might decide ecological distribution of A. flavicollis.--From auth. summ.

Verme, Louis Joseph. PRODUCTION AND UTILIZATION OF ACORNS IN CLINTON COUNTY, MICHIGAN. M.S. thesis, Mich. State U. 1953.

Acorn production was low in 1952. In closed stands, production was largely confined to the tops of trees. Grestest quantities of seed were on s. facing limbs, then w., e., and n. Production of border trees was similar to that of interior trees. About 60-80% of trapped acorns were damaged by insects. Animals damaged 10-15% of these and may have removed 30-40% more from the trees, to judge from empty cups. An acorn estimation technique was devised from data obtained from acorn traps. Feeding studies showed that chipmunks consumed an av. of 6.1 acorns per day, white-footed mice an av. of 1.8 per day. --From auth. summ. supplied by G. A. Petrides.

STRIPPED LAND & MISCELLANEOUS HABITATS

Dinsmore, Bruce Heasley. ECOLOGICAL STUDIES OF TWELVE STRIP MINE PONDS IN CLARION COUNTY, PENNSYLVANIA. Ph.D. thesis, U. Pittsburgh. 118 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

STRIPPED LAND & MISCELLANEOUS HABITATS--Continued

Klimstra, W. D. (S. Ill. U., Carbondale.) THE POTENTIAL OF WILDLIFE MANAGEMENT ON STRIP-MINED AREAS. Ill. Wildl. 14(2): 5-10, 3 photos. Mar. 1959.
This is a good, realistic review of facts about conditions in strip-mined areas, relative values of these areas as compared with other land, and what can be done by way of management for wildlife and fish. Data are based largely on the S. Ill. U. study area, which has been investigated by a series of workers. The present paper is a detailed summary of findings and contains much useful information on many facets of the problem. It should be of value to anyone concerned with utilization and management of strip-mined tracts.

CONTROL OF UPLAND VEGETATION WITH HERBICIDES ETC.

Ray, Hurlon C. (US Soil Cons. Serv., Fayetteville, Ark.) AERIAL CHEMICAL REDUCTION OF HARDWOOD BRUSH AS A RANGE IMPROVEMENT PRACTICE IN ARKANSAS. J. Range Mgt. 11(6): 284-290, 1 map. Nov. 1958.

MAMMALS--GENERAL

Adams, Wm. H., Jr. (Ala. Poly. Inst., Auburn.) A PLASTIC HIND-FOOT MEASURING DEVICE. J. Wildl. Mgt. 23(1): 115-116, 1 photo. Jan. 1959.
Describes a plastic device which provides rapid, accurate measurements for large-scale mammal surveys.--Author.

Eibl-Eibesfeldt, Irenäus. (Inst. Verhaltensphysiologie, Seewiesen, Post Landstetten, über Starnberg, Obb. Germany.) DAS VERHALTEN DER NAGETIER (GLIRES: LAGOMORPHA + RODENTIA). Handbuch der Zoologie (Berlin), Bd. 8, Teil 10, No. 13 (Lief. 12): 1-88, illus. Feb. 1958. [From J. Mamm. 40(1).]

Folk, G. Edgar, Jr., and R. L. Farrand. (State U. Iowa, Iowa City.) HIBERNATION AS A BIOCLIMATOLOGICAL RESPONSE. 2-p. reprint from Internatl. Soc. Bioclimatology & Biometeorology, First Bioclimatological Congress, Vienna, Sept. 1957.
"In summary it is apparent that populations which have experienced the bioclimatological response of hibernation, are very different animals in a physiological sense from those which did not hibernate. This factor should be taken into account in discussions of speciation. The function of hibernation can probably be expressed by Pearson's phrase, 'metabolic parsimony.' Is this 'metabolic parsimony' of benefit to the species? We have some evidence that hamsters which hibernate live longer. Perhaps the cold-vacation path of hibernation may be considered of benefit to the species." Experimental evidence is reported.

Folk, G. Edgar, Jr., and Mary A. Folk. (State U. Iowa, Iowa City.) A DISPOSABLE ISOLATION CAGE FOR HAMSTERS AND SMALL MAMMALS. J. Animal Technicians Assn., Dec. 1958. 3 unnumbered p., 4 photos in reprint.

Howard, Walter E. (U. Calif., Davis.) RELATION BETWEEN LOW TEMPERATURE AND AVAILABLE FOOD TO SURVIVAL OF SMALL RODENTS. J. Mamm. 32(3): 300-312. Aug. 1951.
Among other things, this paper demonstrates that small mammals can be kept alive in live traps in cold weather by provision of plenty of palatable, nutritious food.

MAMMALS--FAUNAS AND MANUALS

Banfield, A. W. F. (Natl. Mus. Can., Ottawa.) THE MAMMALS OF BANFF NATIONAL PARK, ALBERTA. Natl. Mus. Canada, Bul. no. 159. v + 51 p., 9 photos, 5 maps. 1958. $1.00, paper, from Queen's Printer, Ottawa.
A valuable report that should be of reference value to students of other areas in the region. It is based on much work by the author and other wildlife men in the park. Opening sections describe the park and its vegetation, tell about history of exploration, and discuss faunal affinities of the mammals.

The rest of the booklet is an annotated list. The usual data on localities, specimens, and habitats are given for all species, and intergradation is discussed for many species. In addition, status and abundance are discussed carefully with full use of historical information. Especial attention is devoted to population changes of big game and predators, and to the ecological factors involved in these changes.

Brooks, David M. (Ind. Dept. Cons.) HOW LONG CAN THEY SURVIVE? Outdoor Ind. 1(5): 14-17, maps & drawings. Nov. 1957.

Distribution of 4 species of mammals that are now rare in Ind. is mapped, status of the species in Ind. is discussed, and notes on natural history are given. Badgers occur in 33 counties, chiefly in n. Ind. They are unprotected. Swamp rabbits occur in 5 sw. counties. Prospects for their survival are poor because continued drainage is destroying their bottomlands habitat. Coyotes are recorded from various places in the state. Although bounties are paid for their capture, their status is likely to remain about as it is. There are 3 scattered recent (1952 and 1954) records for the bobcat; this species may or may not occur naturally in Ind. today.--L. F. Stickel.

Cameron, Austin W. (Natl. Mus. Canada, Ottawa.) MAMMALS OF THE ISLANDS IN THE GULF OF ST. LAWRENCE. Natl. Mus. Can. Bul. no. 154. iii + 165 p., 38 figs. 1958. $2.00, paper, from Queen's Printer, Ottawa.

A large and important paper that presents monographic treatments of the mammals of Newfoundland, Cape Breton Island, Prince Edward Island, Anticosti Island, and the Magdalen Islands. Full species accounts are given for each area. Species accounts take up taxonomy, history, status, population fluctuations, habitats, competition with related species, and other ecological matters on which information was obtained. Maps show distribution of all forms. Zoogeography of the islands is stressed in special sections of the volume. Geological and zoological evidence is brought to bear on questions of land connections and origins of the faunas of each island. Certain of the islands have had no connection with the continent since glaciation cleaned the slate, but others obviously were well connected in the recent past. No endemic species are recognized, but several well-marked subspecies apparently have arisen since glacial times; speciation in the islands is discussed. Comparisons are made with insular distribution and speciation elsewhere in the world, especially Britain. Interesting data on ecology are scattered through the book. Significant amounts of taxonomic information are given for many species. Available data on numbers, fluctuations, and ecological status of game mammals are presented.

Hall, E. Raymond, and Keith R. Kelson. (U. Kans., Lawrence.) THE MAMMALS OF NORTH AMERICA. 2 vols. Ronald Press, 15 E. 26th St., N. Y. 10, N. Y. Vol. I: i-xxx, 1-546, 1-79 (index). Vol. II: i-viii, 547-1083, 1-79 (index). 500 maps, 538 skull drawings, 186 sketches of mammals, 15 other figs. March 1959. $35.00, cloth, per set.

These great volumes of 8 x 11 in. contain 1279 pages of 2 columns each, have 1239 maps and drawings, and weigh nearly 9 lbs. They constitute the most valuable single work in Am. systematic mammalogy that has ever appeared. "Hall and Kelson" will be found wherever there is a significant collection of Am. mammals and it will be the reference most often consulted.

All mammals from Greenland to Panama, including the West Indies, are included --3,800 named kinds. Both keys and diagnoses are provided for all categories down to species. Keys are based primarily on morphology but employ geographic distribution where this improves clarity and simplicity, as it does in difficult and poorly known groups. Subspecies are listed and their ranges are mapped in detail. Marginal localities are spotted on the maps and listed, with indication of source, for each sp. or ssp. Skull drawings are given for most well established species; these aid greatly in use of keys and diagnoses. Many species are also represented by sketches of whole mammals. The more important synonymy is cited for all forms. Common names are given for species and genera. An essay on zoogeography of Am. mammals appears in Vol. I. Vol. II has a section on collecting and preserving mammals, a 30-p. list of literature cited, and 5 p. of addenda (new records and changes since text was completed). Both volumes have indexes of common and scientific names, and both have endpaper maps showing

states and provinces on one hand, life zones on the other.

This work is an essential reference, an admirable stepping stone. It is not to be viewed as a bible. It is a summary of the present state of knowledge as the authors saw it after many years of labor by themselves and cooperators. The authors point out many places where changes will be needed. Any critic can find things he would have done differently, for a job so huge, and based so largely on the literature, is bound to have some errors and many points on which judgments differ. We wish, for example, that certain names had not been changed, that molar patterns had been specifically illustrated where important, and we feel that so technical a work needed a glossary. Any criticism seems graceless, however, in view of the herculean accomplishment represented by this work. Few people could have completed the task with any amount of help. Hall and Kelson deserve an enormous amount of credit for doing a good professional job and for producing a reference that was badly needed.

Layne, James N. (U. Fla., Gainesville.) NOTES ON MAMMALS OF SOUTHERN ILLINOIS. Am. Midl. Nat. 60(1): 219-254, 1 map. July 1958.

Describes the 14-county area and gives much information on many of its 42 mammalian species. Species accounts are long and include data on such topics as habitats, natural history observations, foods, breeding records, measurements, problems of subspecific identification, and localities.

Marlow, B. J. (Australian Mus., Sydney.) A SURVEY OF THE MARSUPIALS OF NEW SOUTH WALES. C.S.I.R.O. Wildl. Res. 3(2): 71-114, 34 maps. Dec. 1958.

Species accounts provide brief description, statement of distribution and status, and range map for each marsupial of the state. Forty-two percent of the marsupials are extinct or rare. This decline is correlated with decreasing density of vegetation. The decrease ranges from nil in rain forest to 43% in open plains. Factors are discussed; the most important is alteration of habitat by modern man. "It is difficult to suggest a useful programme for the conservation of most of the rare species, but it is thought that a National Park where woodland species may be preserved and where visitors would be assured of seeing them, might be practicable."--From auth. summ.

Siivonen, Lauri. SUURI NISÄKÄSKIRJA [Great Book of Mammals]. Otava Publ. Co., Helsinki. 800 p., illus. 1956. 3400 Finnish Marks. [From review by Robert Rausch, J. Mamm. 40(1).]

In Finnish. Comprehensive work on mammals of Finland. Based on much field work by author and others. One section discusses the history of the mammalian fauna, but nearly 700 pages are devoted to species accounts. These take up distribution, reproduction, movements, food habits, and general ecology. There are about 575 photos, 25 in color, 68 maps, and many drawings. Illustrated keys are provided for all species. The book treats 87 species, including expected, introduced, and recently extinct species. Ranges of larger carnivores in Finland have shrunk greatly since 1880. Wolf, bear, wolverine, and lynx are found today only in remote ne. sections of Finland. Am. beaver is expanding its range and interbreeding freely with native beaver. Siivonen's book is an important source of knowledge of natural history of boreal mammals.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

Beattie, Jack D. SMALL MAMMAL CATCHES UNDER TWO INTENSITIES OF DEER BROWSING. M.S. thesis, Mich. State U. 1955.

Small mammals were snap trapped in areas of different browse conditions. More were caught in lightly browsed areas than in heavily browsed areas. Some differences were found also in different vegetation types.--From auth. summ. supplied by G. A. Petrides.

Christian, John J. (Naval Med. Res. Inst., Bethesda 14, Md.) CONTROL OF POPULATIONS IN RODENTS BY INTERPLAY BETWEEN POPULATION DENSITY AND ENDOCRINE PHYSIOLOGY. Wildl. Dis. 2: 1-38 p., 7 figs. On 1 Microcard. Jan. 1959.

Population density is the dominant factor in control of population growth. Other factors must act through and in addition to this one. Effects of density on pituitary-adrenocortical and pituitary-gonadal systems were studied in house

mice and Norway rats. Responses to density included enlargement of adrenal cortex, and decrease in size and function of reproductive organs. Both birth rate and infant survival declined as density rose. Birth rate fell because of prenatal mortality and lower fertility. Infant mortality mainly represented progressive failure of lactation. Reserpine blocked or reduced these effects, which indicated that social stress was responsible. This was also suggested by fact that the most dominant individuals had the least adrenal hypertrophy. Effects carried over into young: mice nursed by ?? that had been crowded were 15% lighter at weaning than mice nursed by isolated ??, regardless of which ? was the mother. This represented failure of lactation. There were no intrauterine effects on young born to crowded mothers: all differences developed during nursing. Second generation of young reared by crowded mothers was also smaller. Hence effects of crowding persist at least 2 generations and are manifested mainly through decrease in lactation.

Cook, Sherburne F., Jr. (MVZ, U. Calif., Berkeley.) THE EFFECTS OF FIRE ON A POPULATION OF SMALL RODENTS. Ecology 40(1): 102-108, 4 figs. Jan. 1959.
A wildfire that swept through mixed brush and grassland in the Berkeley Hills essentially annihilated all species of mice, either directly or through removal of food or cover. Cover seemed to be the limiting factor in recovery, especially for Microtus, which apparently needed a year's accumulation of mulch to furnish cover for runways. The change from a grassland of many dominants to one preempted by seed-producing annuals was beneficial to seed-eating mice. This was especially true for Reithrodontomys, which irrupted on the burned grass area during a period of seed production during the second winter's growth after cover requirements had been met. The change from brush to grass, as happened on the burned brush area, was accompanied by a general shift from brush-dwelling species of mice to grass-dwelling species.--From auth. summ.

Crowcroft, Peter, and F. P. Rowe. (Brit. Mus. Nat. Hist., London S.W.7.) THE GROWTH OF CONFINED COLONIES OF THE WILD HOUSE-MOUSE (MUS MUSCULUS L.): THE EFFECT OF DISPERSAL ON FEMALE FECUNDITY. Proc. Zool. Soc. London 131(3): 357-365, 3 graphs. Nov. 1958.
1. Post-mortem examination of female house mice from a confined population showed a higher proportion of non-fecund females than would be found in a wild-caught sample of similar age composition. 2. A similar population was allowed to disperse into a larger pen, whereupon the reproductive rate increased. The result was not clear-cut, however, as the increase began too soon to be attributable to dispersal alone. 3. Another similar population was divided into two colonies of unequal size. Non-fecund females transferred to a new large pen with few other mice became fecund and reproduced successfully, while those placed in a new small crowded pen remained non-fecund. 4. A completely adult population in which no litters had been born for over six months was allowed to disperse into a large pen. A majority of females became fecund and conceived within about one week. The numbers were doubled within eight weeks. 5. The results suggest the existence of a self-regulatory mechanism, which operates at population densities seldom, if ever, reached in free-living populations.--Auth. summ.

Gashwiler, Jay S. (US F&WS, Ore. State Coll., Corvallis.) SMALL MAMMAL STUDY IN WEST-CENTRAL OREGON. J. Mamm. 40(1): 128-139, 1 map. Feb. 1959.
Peromyscus maniculatus rubidus population estimates ranged from 0 to 2.5 animals per acre in old-growth Douglas-fir. The population increased after felling and logging. Burning caused the animals to go to the nearest green timber; after the fire they returned to the cutting. Shortly after burning, the density was 2 to 3 times as great as in virgin timber. The following year it was about twice as great. Peromyscus traveled between the clearcut and the timber--some individuals ranged about 1/4 mile. Breeding was not an important factor in repopulation of the clearcut immediately after fire. The population estimate for Clethrionomys californicus obscurus ranged from 0.5 to 4.0 animals per acre. These voles increased after logging but decreased sharply after the burn, only to increase again before winter. None was captured on the grid the first season after burning. These voles apparently remained on the area during the fire. Breeding was considered an important factor in maintaining and building up the population during felling, logging and the immediate post-burning period. It was estimated there were 1.4 to 3.8 Eutamias townsendi

cooperi per acre in the virgin timber. Logging caused a modest reduction. The first year after burning, there were about 0.5 animals per acre. Many chipmunks moved to the forest when the cutover was burned. They apparently ranged from the timber onto the burn the first season after the fire, but did not reside there. Microtus oregoni, Mustela erminea, Sorex trowbridgei, Sorex vagrans, Neotoma cinerea and Ochotona princeps were captured on the clearcut after logging. Tamiasciurus douglasi, Glaucomys sabrinus and Lepus americanus were neither captured nor observed on the area after logging.--Author.

Ogilvie, R. T., and Thomas Furman. (State Coll. Wash., Pullman.) EFFECT OF VEGETATIONAL COVER OF FENCE ROWS ON SMALL MAMMAL POPULATIONS. Ecology 40(1): 140-141. Jan. 1959.

Trapping of small mammals along shrubby, weedy, and bare fence lines in Whitman County, Wash., all bordered by tilled fields, showed that small mammal populations were nearly equal in the first two but lower in the last. Peromyscus maniculatus was present in almost equal numbers in each fence type. Microtus montanus was most abundant in weedy fence rows, sparsely present in shrubby fence rows, and rare in bare fence rows. This is interpreted as a cover effect. --Auth. summ.

Petrusewicz, Kazimierz. (Lab. Ecol., Polish Acad. Sci., Warsaw.) INVESTIGATION OF EXPERIMENTALLY INDUCED POPULATION GROWTH. Ekologia Polska - Seria A 5(9): 281-309, 4 figs. 1957 (1958). [Copy in US Dept. Int. Library.]

In English with Polish summary. In a series of experiments, small numbers of laboratory mice, usually 8 ♀♀ and 3 ♂♂, were put in cages together to start colonies, which were allowed to grow. After initial conflicts, breeding began and colonies increased until signs of crowding and conflict appeared; numbers then declined as a result of decreased fertility and poor survival of young. If a colony did not die out completely, growth began again after a while and the cycle was repeated. Densities at various phases of the cycle varied between colonies. These spontaneous population changes were a background for evaluation of experiments, which consisted in transferring a whole colony to a new cage at one of various stages in the population cycle. After transfer, most populations first declined slightly, then increased; often the increase began at a higher density and reached a higher density than in long prior history. Growth began sooner and was greater when cages were changed while populations were in either the stabilization period or the growth period, but occurred also in those that were in periods of peak or decline. Growth was stimulated even when transfers were to cages of the same or smaller sizes. The author concludes that the social structure developed in the colony determines the density levels for population pressures to act, and that changing the environment by changing the cage upsets the original social structure and results in a new arrangement, so that the colony behavior begins anew.--L. F. Stickel.

Pitelka, Frank A. (U. Calif., Berkeley.) SOME CHARACTERISTICS OF MICROTINE CYCLES IN THE ARCTIC. p. 73-88, 6 figs., in Arctic Biology, Biology Colloquium 1957. Ore. State Coll., Corvallis. 1957.

Review of work being done in the coastal plain of n. Alaska and a discussion of preliminary findings. Habitat and distribution data are included for a number of the small mammals. The short term cycle is most evident in the coastal plain, where the brown lemming (Lemmus trimucronatus) is the chief herbivorous mammal. Toward the interior, the topography is more varied, there are more species, and cycles are less pronounced. In the brown lemming near Barrow, the decline from the cyclic peak occurs rapidly during a summer; if the cyclic interval is 4 years instead of 3, the low density period continues over 2 summers. In the summer of peak numbers, vegetation is cut or killed and the lemmings are very vulnerable to predation, which is the chief factor in producing the decline. Evidence from coastal and interior areas gives little reason to suppose that cycles are in phase over large areas of the Arctic.--L. F. Stickel.

Pruitt, Wm. O., Jr. (Box 282, College, Alaska.) A METHOD OF LIVE-TRAPPING SMALL TAIGA MAMMALS IN WINTER. J. Mamm. 40(1): 139-143, 1 fig. Feb., 1959.
Wooden chimneys (7.5 x 12 x 45 in.) with hinged lids were attached to stakes driven into the earth. One end of chimney rested on ground and one side of this end was cut out enough to allow small mammals to enter. Live traps were set on ground in these chimneys. Cup hooks in top of trap made it possible to raise and lower traps with hooked rod. Trapping was done only after snow became deep and dense enough that a snowshoe trail would not crush snow at ground level and thus hamper animal movement. Rolled oats were used to bait traps and pre-bait chimneys. Use of surplus food was found better than use of bedding in traps. Chimneys are not recommended for use where there is enough wind to cause hollows around them. Trapping by this method has revealed that Clethrionomys rutilus tends to avoid the zones of thin snow under spruce trees, and that this mouse does not have a diel activity rhythm when living under snow. The rhythm is also lacking in summer, when the Fairbanks, Alaska, area has about 22 hours of sunlight daily.

Southwick, Charles H. (Ohio U., Athens.) POPULATION CHARACTERISTICS OF HOUSE MICE LIVING IN ENGLISH CORN RICKS: DENSITY RELATIONSHIPS. Proc. Zool. Soc. London 131(2): 163-175, 2 graphs. Sept. 1958.
4212 Mus were collected from 40 ricks. Rick populations were grouped into 4 density classes based on number of weaned mice per m^3. Reproduction varied but little with density. This was also true of mortality. Fecundity of both sexes remained high in all density classes. Fertility was less at high densities, but still high. Pregnancy rate declined from 58% at low density to 43% at high density. Av. litter declined similarly from 6.23 to 5.11. Resorption of embryos increased with density. So did incidence of wounded ♂♂. Adrenal hypertrophy did not appear. The relative stability of rick populations with increasing density probably reflects high quality of the habitat. Density effects are minimized by abundance and distribution of food and cover. Despite uniformity of the habitat, however, rick populations varied widely in size and structure.

MAMMALS--PARASITES AND DISEASES

Anon. RABIES IN ONTARIO. J. Am. Vet. Med. Assn. 134(4): 168. Feb. 15, 1959.
"Following the extensive epizootic of rabies in northwestern Canada (Canad. J. Pub. Health, Oct. 19, 1954: 316), the disease appeared in northern Ontario in 1954 with 46 confirmed cases. During the year 1955 to 1956, the 137 confirmed cases included 85 foxes, 23 dogs, 24 cattle, and 4 wild animals. During July, 1958, there were 161 positive cases, more than in the entire preceding year.--Canad. J. Pub. Health, 49, (Oct., 1958): 435." Copied completely.

Burgdorfer, Willy. (Rocky Mtn. Lab., Hamilton, Mont.) COLORADO TICK FEVER. THE BEHAVIOR OF CTF VIRUS IN THE PORCUPINE. J. Infect. Dis. 104(1): 101-104, 5 figs. Jan.-Feb. 1959.

Burgdorfer, Willy, and Carl M. Eklund. (Rocky Mtn. Lab., Hamilton, Mont.) STUDIES ON THE ECOLOGY OF COLORADO TICK FEVER VIRUS IN WESTERN MONTANA. Am. J. Hygiene 69(2): 127-137, 1 map. Mar. 1959.
One of the findings of this research report is that "CTF appears to be characterized by sharply localized areas of infection correlated in this instance with the presence of the golden-mantled ground squirrel."

Galton, Mildred M. (US Pub. Health Serv., Chamblee, Ga.) THE EPIDEMIOLOGY OF LEPTOSPIROSIS IN THE UNITED STATES. Pub. Health Rep. 74(2): 141-148, 3 figs. Feb. 1959.
Authoritative review of subject; 49 references. A short article that follows, p. 149-152, is: "Control of leptospirosis in man and animals," by Robert W. Menges.

Hutchison, Wm. Forrest. STUDIES ON THE HYDATID WORM, ECHINOCOCCUS GRANULOSUS, IN MISSISSIPPI. Ph.D. thesis, Tulane U. 114 p. 1958. [From abstract in Dissertation Abstracts 19(8).]

Levi, M. I., L. N. Kisliakova, and others. INVESTIGATION OF RODENTS AND THEIR ECTOPARASITES IN THE FOCI OF LYMPHOCYTIC CHORIOMENINGITIS. Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii 1954(7): 44. Transl. 59-10029. 3 p. Order from Libr. Congress or SLA Transl. Center, 86 E. Randolph, Chicago, Ill. $1.80, microfilm or photocopy. [From Tech. Transl. 1(2).]

"The duration of the existence of foci of lymphocytic choriomeningitis, and the specific composition of rodents and their ectoparasites were studied. Observations of 4 loci of lymphocytic choriomeningitis were conducted during 1950 through 1952. One of the loci was situated in the center of the city, 2 in the outskirts, and 1 beyond the city limits. Mice were caught during all seasons of the year, and their internal organs were examined for the presence of the virus. This virus was isolated most often from rodents which were caught at the focus situated in the center of the city. In 3 out of 4 investigated loci, blood-sucking ticks, B. bacoti and Al. sanguineus, and ticks of the family Laelaptidae were uncovered."

Sweatman, Gordon K. (U. Otago, Dunedin, N. Z.) BIOLOGY OF OTODECTES CYNOTIS, THE EAR CANKER MITE OF CARNIVORES. Can. J. Zool. 36(6): 849-862, 5 figs. Dec. 1958.

Morphology, life history, lack of host specificity, synonymy.

Sweatman, Gordon K. (U. Otago, Dunedin, N. Z.) ON THE LIFE HISTORY AND VALIDITY OF THE SPECIES IN PSOROPTES, A GENUS OF MANGE MITES. Can. J. Zool. 36(6): 905-929, 17 figs. Dec. 1958.

The stages in the life cycle of P. cuniculi and other species or varieties in the genus are described. Host specificity currently attributed to the different types in Psoroptes is disproved, but differences exist in individual susceptibility. The six auricular types of psoroptic mites are reduced to two, and the five kinds of body mites to four. A dendrogram is included which shows the relations between the genera and species in Psoroptidae.--Auth. abst. [These mites are parasites of wild and domestic mammals.]

SHREWS, MOLES, BATS

Constantine, D. G. (US Pub. Health Serv., CDC, State Coll., N. M.) ECOLOGICAL OBSERVATIONS ON LASIURINE BATS IN THE NORTH BAY AREA OF CALIFORNIA. J. Mamm. 40(1): 13-15. Feb. 1959.

24 Lasiurus borealis teliotis were captured in tree shelters. All were in domesticated fruit trees. Apparently they preferred apricot trees, of specific physiognomy and in particular environment, in summer and fall, when these trees were in leaf, but they were in orange trees in early spring. Flight seemed to be retarded when environmental temp. dropped to 70°F. A jay, Aphelocoma californica, was observed pecking at a red bat on the ground. Two L. cinereus were shot on different occasions when they seemed to be flying ahead of moving fog banks. L. cinereus was found on two occasions in cherry trees.--Author.

Craft, T. J., Marian I. Edmondson, and Robert Agee. A COMPARATIVE STUDY OF THE MECHANICS OF FLYING AND SWIMMING IN SOME COMMON BROWN BATS. Ohio J. Sci. 58(4): 245-249. July 1958. [From J. Mamm. 40(1).]

Davis, Wayne H. (U. Minn., St. Paul.) DISPROPORTIONATE SEX RATIOS IN HIBERNATING BATS. J. Mamm. 40(1): 16-19. Feb. 1959.

80% of Pipistrellus subflavus wintering in the W. Va. caves are ♂. These ♂♂ have a higher rate of survival than ♀♀. Many ♂♂ remain inactive in caves in summer. The summer population outside caves has a nearly 1:1 sex ratio. In wintering caves, the % of ♀♀ rises as one goes s. In a cave in sw. Ga. the sexes are equal. Sex ratio in a cave changes from year to year. Colder winters drive more bats and a higher % of ♂♂ into caves.--Author.

Gould, Edwin. (Tulane U., New Orleans, La.) FURTHER STUDIES ON THE FEEDING EFFICIENCY OF BATS. J. Mamm. 40(1): 149-150. Feb. 1959.

Data on numbers of feeding dives made per unit of time suggest that echolocation must be used to achieve such a high frequency of feeding attempts.

Lange, Kenneth I. (U. Ariz., Tucson.) SORICIDAE OF ARIZONA. Am. Midl. Nat. 61(1): 96-108, 8 figs. Jan. 1959.
"The known altitudinal range, geographical distribution, ecological distribution, and records of occurrence are given for each species." Kinds of shrews present in the state are Sorex vagrans monticola, S. merrismi leucogenys, S. nanus, S. palustris navigator, and Notiosorex c. crawfordi.

RABBITS AND PIKAS

Anon. CONTROLLING RABBITS. US F&WS, Branch Predator & Rodent Control, 59 Temple Place, Boston 11, Mass. 4 p., 1 fig. Jan. 1959.
Extension leaflet. Gives suggestions for control by live trapping, fences, and a variety of repellents.

Arnold, David A. (2551 Lake Shore Dr., Escanaba, Mich.) WHY BUY WESTERN RABBITS? Pa. Game News 30(2): 12-17, illus. Feb. 1959.
Rabbit populations on 80 acres of farmland at Pa. State U. were studied before and after hunting seasons of 1947 and 1948. Box traps and observation censuses were made. Records of tagged rabbits were obtained from hunters. Each year the area seemed "shot out" under the heavy hunting pressure, but each year an adequate stock of rabbits remained. When the habitat has enough food and cover for rabbits, the native rabbits will maintain themselves and there is no need for stocking. Predator control cannot substitute for proper habitat--and if there is proper habitat a stock of rabbits can survive despite predation. Another reason for not importing rabbits is the possibility of introducing disease. When habitat has been improved but a stock is lacking, it is better to use native rabbits, which are well adapted to local conditions.--L. F. Stickel.

Brocke, Rainer Hans. AN EVALUATION OF STRIP CENSUS METHODS FOR COTTONTAIL RABBIT POPULATIONS IN SOUTHERN MICHIGAN. M.S. thesis, Mich. State U. 1957.
Field tests were made of four strip-census techniques (King, Hayne, Kelker, and Webb). Theoretical tests of artificial populations were made on graph paper. Estimates were unsatisfactory, apparently because of the erratic flushing of the rabbits and their tendency to hole up during cold weather. Strip census methods are not considered suitable for measuring cottontail populations in s. Mich.--From auth. summ. supplied by G. A. Petrides.

Crites, J. L., and G. J. Phinney. DIROFILARIA SCAPICEPS FROM THE RABBIT (SYLVILAGUS FLORIDANUS MEARNSI) IN OHIO. Ohio J. Sci. 58(2): 128-130. Mar. 1958. [From J. Mamm. 40(1).]

Geis, Aelred Dean. USE OF TAGGED-UNTAGGED RATIOS IN ESTIMATING RABBIT POPULATIONS. M.S. thesis, Mich. State U. 1952.--From auth. summ. supplied by G. A. Petrides.
See WR 93 p. 40 for abstract of Ph.D. study of which this work was first part.

Hunt, Thomas P. (Texas A & M Coll., Coll. Sta.) BREEDING HABITS OF THE SWAMP RABBIT WITH NOTES ON ITS LIFE HISTORY. J. Mamm. 40(1): 82-91. Feb. 1959.
Reproduction of Sylvilagus aquaticus was studied in 152 specimens from Brazos County, Texas. Captive rabbits were used in 9 attempted artificial inseminations which resulted in 3 known births. This method seems superior to natural mating in accurately determining gestation period, which is 39-40 days. Young are born with pelage well developed and eyes closed. Eyes begin to open and the animal is able to walk on about its 2d or 3d day. Gravid does were found in each month except Sept., Oct., and Dec. Other evidence indicated that some breeding occurred even in these months. About the middle of Jan., a sudden increase in % of gravid does occurred. The peak for the year was in late Feb. and March. Of 58 adult does taken, 28, including 1 immature, were gravid. Pre-natal litter size ranged from 1 to 5, av. 2.83. Litters of 2 and 3 were commonest. Av. litter size was highest during peak of breeding season and was lowest just before period of least fertility. Four genera of helminths and 2 species of arthropod parasites were found. In addition, Eutrombicula alfreddugesi, larvae of Cuterebra buccata, Hoplopsyllus affinis, and Amblyomma americanum were recovered from this host for the first time.--Author.

Lacey, W. S. SOME EFFECTS OF MYXOMATOSIS ON VEGETATION, WITH SPECIAL REFERENCE TO YNYS SEIRIOL. Trans. Anglesey Antiq. Soc. Fld. Cl. 1957: 26-33. 1958. [From J. Animal Ecol. 27(2).]

"Discusses the plants in terms of the feeding-preferences of rabbits, and the results on Puffin Island of the destruction of the rabbit. Comparison with previous flora lists shows the largest number of species yet recorded and a large influx of new species." [The rabbit in question, of course, is the European (San Juan) rabbit, whose release certain U. S. states are still permitting and against which no federal action has been taken. Apparently the situation will be allowed to drift until it is too late.]

Lechleitner, R. R. (Colo. State U., Ft. Collins.) CERTAIN ASPECTS OF BEHAVIOR OF THE BLACK-TAILED JACK RABBIT. Am. Midl. Nat. 60(1): 145-155. July 1958.

Lepus californicus were studied on a refuge in Butte Co., Calif. for 18 months. About 100 were marked and released. No social structure was detected among adults. The hares like to feed in rather open areas that have a good supply of small succulent plants. Feeding may be at any time, but peak is in evening. The animals make forms and rest in them. Hares may react to alarm by flight, freezing, or creeping away, depending on circumstances. Alarms seem to spread from hare to hare. The hares seem to avoid water, but can swim well. Sexual activities are described. Pregnant individuals are somewhat antagonistic to one another; this causes a spacing-out of the animals. Almost all sexual and aggressive behavior is related to the breeding season. Lack of antagonism indicates lack of reproductive activity.

Lechleitner, R. R. (Colo. State U., Fort Collins.) SEX RATIO, AGE CLASSES AND REPRODUCTION OF THE BLACK-TAILED JACK RABBIT. J. Mamm. 40(1): 63-81, 6 figs. Feb. 1959.

435 Lepus c. californicus were examined from Gray Lodge Waterfowl Mgt. Area, Calif., Sept. 1954 to March 1956. Sex ratio was 198 ♂♂ to 191 ♀♀. Prenatal sex ratio was 26 ♂♂ to 25 ♀♀. Mortality was divided equally between sexes. Distribution of age classes in sample was 35% 2-9 mos. old, 38% 7-12 mos. old, and 27% over 1 yr. old, indicating a population turnover within about 5 yrs. Although there was a yearly cycle of testicular growth and sperm production, sexually active ♂♂ were present in all mos. Corpora lutea of jack rabbits are larger than those of domestic rabbits. There is a post-partum heat. During height of breeding season, pregnant and lactating ♀♀ were the rule. There was no evidence of superfetation. Jack rabbits are capable of breeding when 8 mos. old. Pregnant ♀♀ were found during every month but did not appear in large numbers until Jan. By Feb. all ♀♀ collected were pregnant. Older ♀♀ maintained 100% breeding activity from Jan. through August. The av. number of embryos per ♀ was 1 in Jan., 4 in April and 1 in August. Prenatal mortality was estimated at approx. 47%. The rainfall pattern and greening of vegetation seemed to be the main factors associated with peak of breeding season.--Author.

Lord, Rexford D., Jr. (Ill. Nat. Hist. Surv., Urbana.) THE IMPORTANCE OF JUVENILE BREEDING TO THE ANNUAL COTTONTAIL CROP. Trans. 23d N. Am. Wildl. Conf.: 269-275. 1958.

Monthly samples from s. and central Ill. counties furnished data on reproduction of cottontails in Ill. In 1957, the beginning of the season was indicated when 18% of rabbits taken in last week of Feb. showed implantation. The last pregnant ♀♀ were taken the second week in Sept., when 9% were pregnant. Monthly trends in prevalence of pregnancy and lactation and av. litter size were determined. Establishment of mean litter size of 5.52 ± 3.11, and av. prevalence of pregnancy of 0.59 for each month of season, gave av. of 21.98 young rabbits produced per ♀ in 1957. These data made it possible to calculate an annual probability of dying of 0.92 (assuming a stationary population). In Aug., 55% of breeding ♀♀ were juveniles. In Sept. this figure rose to 76%. Calculations indicate that juvenile breeding accounts for 24 to 27% of annual cottontail crop available in Nov. This portion of the crop could make the difference between normally productive years and highly productive years. The proportion of the annual crop produced by juveniles is dependent on 3 factors: (1) size of adult carry-over from previous winter, (2) success of adult breeding early in season, and (3) success of juvenile breeding. The last factor probably could not be determined in time to be used, but the first 2 factors might be utilized in setting bag limits each year to take advantage of years of extra productivity.--Author.

Mörzer Bruijns, M. F. (R.I.V.O.N., Soestdijkseweg 33 Noord, Bilthoven, Neth.) DE MYXOMATOSE OP VLIELAND. De Levende Natuur 61: 227-231, 2 photos. 1958.

Myers, K., and W. E. Poole. (Wildl. Surv. Sec., C.S.I.R.O., Albury,N.S.W.) SEXUAL BEHAVIOUR CYCLES IN THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 3(2): 144-145. Dec. 1958.

Strong observational evidence that ?? have 7-day cycles in degree of sexual activity. These cycles probably correlate with the known follicular cycle of about 7 days.

Mykytowycz, R., and E. R. Hesterman. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) ON THE OCCURRENCE OF COCCIDIAL OOCYSTS AND NEMATODE OVA IN SOFT AND HARD FAECES OF THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 3(2): 142-143. Dec. 1958.

Coprophagy does not induce any periodicity in output of coccidial oocysts or nematode ova. Hence either hard or soft pellets can be used for estimating relative levels of infestation of these parasites.

Newman, Duane Emil. FACTORS INFLUENCING THE WINTER ROADSIDE CENSUS OF THE COTTONTAIL RABBIT IN SOUTH-CENTRAL IOWA. M.S. thesis, Iowa State Coll. iii + 74 p., 5 figs. 1957. [Copy in US Dept. Int. Library.]

Newman, Duane E. (Iowa State Coll., Ames.) FACTORS INFLUENCING THE WINTER ROADSIDE COUNT OF COTTONTAILS IN SOUTH-CENTRAL IOWA. Presented at 19th Midwest Wildl. Conf., Dec. 9-11, 1957, Milwaukee, Wis. 5 p., 2 figs. 1957.

Standardized morning and evening counts were made over 20-mi. routes. 70% of rabbits were seen during morning counts, 30% during evening counts. Middle part of morning counts and latter part of evening counts produced most rabbits, a further reflection of effect of time of day. In mornings, most rabbits were seen on roads; in evenings most were seen in adjacent fields. A greater proportion was seen on roads in Feb. and Mar. than in Jan. Weather factors strongly affected the numbers of rabbits seen; effect was most significant in evening counts; snow was most important. Validity of weather correlations is supported by statistical tests. Formulas are developed for adjustment of counts to different snow conditions.--L. F. Stickel.

Ross, Sherman, Victor H. Denenberg, G. P. Frommer, and P. B. Sawin. (U. Md., College Park.) GENETIC, PHYSIOLOGICAL AND BEHAVIORAL BACKGROUND OF REPRODUCTION IN THE RABBIT: V. NONRETRIEVING OF NEONATES. J. Mamm. 40(1): 91-96. Feb. 1959.

Nine newly parturient domestic rabbits of mixed ancestry were tested for retrieving behavior under a variety of conditions. No retrieving of young was observed. Maternal attention toward young ranged from no concern to solicitous licking. Review of literature, largely naturalists' writings, provided no convincing evidence that retrieving was common among wild lagomorphs, although several authors believed in its existence. Tentative interpretations of the absence of this behavior are made in terms of the rabbit's adaptation to its environment and the neonate's independence from extensive maternal care.--P. B. Sawin.

Schofield, Raymond Dale. A STUDY OF RABBIT SURVIVAL ON A PUBLIC HUNTING AREA. M.S. thesis, Mich. State U. 1957.

Survival of rabbits at the Rose Lake Station, near Lansing, Mich., was estimated by statistical analysis of data from live-trapping and from hunter kill reports. Records covered the years 1938-55. One statistical procedure showed no significant changes in survival between the earlier and more recent years. Another procedure indicated that the greater number of hunters in recent years took a greater proportion of the population. Annual crippling loss, 1951-55, was estimated to be about 10% of pre-hunting population. There was 70% mortality of adult rabbits from one breeding season to the next. Juvenile mortality was higher--only about 13% survived to their first breeding season. There was no apparent difference in survival of the sexes. Each adult ? rabbit must produce 12 juveniles (to the age when they enter traps) in order to maintain a constant population level from one year to the next.--From auth. summ. supplied by G. A. Petrides.

Thompson, Harry V. (Ministry Agr., Tolworth, Surrey, Eng.) RABBIT CONTROL IN AUSTRALIA AND NEW ZEALAND. Agriculture 65: 388-92, 440-4, 1 pl. of 2 photos. 1958.

Control methods and organizations in these countries are described, with emphasis on the successful "killer" policy of N. Z. The poison 1080 is one of the chemicals used in various programs; carrot baits treated with it are distributed by air in some programs. Damage to game birds and native mammals has been less than feared. Arsenic and phosphorus are still used. Myxomatosis, however, is discounted as a reliable and consistent means of control: it doesn't work regularly enough and too much resistance to it is appearing. It always required weather that favored mosquito outbreaks. Highly improved pastures of fast-growing grass "are often lightly infested with rabbits, and this is believed to be a case of the habitat controlling the rabbit, because the grass grows so rapidly that it becomes unsuitable for rabbits, which prefer a very short turf." "Evidence is accumulating from several parts of the world that the European rabbit is favoured by the sort of habitat created by man's agricultural activities, which produce close-cropped grass and nutritious young cereals." Plate shows grain field grazed to the earth by rabbits and same field growing high in wheat after control of rabbits.

Wight, Howard M. (Mo. Cons. Comm., Columbia.) ELEVEN YEARS OF RABBIT-POPULATION DATA IN MISSOURI. J. Wildl. Mgt. 23(1): 34-39, 2 graphs. Jan. 1959.

Population data from mid-summer census of cottontail rabbits yields data on statewide abundance and reproductive success. Prediction of hunting success is made by multiplying breeder abundance by reproductive rate. The resultant fall-population index shows a high degree of correlation with hunter success ($r = 0.94$). Changing reproductive rates are responsible for altered hunting success. Reasons for changes are unknown, yet knowledge of history of rabbit populations has narrowed the search to factors affecting reproductive physiology. Population data provide a basis for interpreting research findings. Interpretation of studies of food habits of predators, predator-prey relationships, and evaluation of food and cover management, are examples of uses of rabbit population data in research.--Author.

RODENTS--MISCELLANEOUS

Batson, Jackie D. STUDIES ON RHOAD'S COTTON MOUSE, PEROMYSCUS GOSSYPINUS MEGACEPHALUS, IN ALABAMA. J. Tenn. Acad. Sci. 33(2): 123-132. 1958. [From Biol. Abst. 33(4).]

Studies were conducted for approximately 18 months. Four hundred specimens were available for study. The findings presented are: description of relative body proportions, color variations that occur with age and season, observations of a captive colony, reproduction, ecology of trapping environments, and habits such as eating, fighting and nesting. A discussion of ectoparasites is included. --From auth. abst.

Carlton, Robert Austin. FOOD HABITS OF SMALL MAMMALS IN THE RICE FIELD DIKE COMMUNITY IN BOLIVAR COUNTY, MISSISSIPPI. Ph.D. thesis, Ala. Poly. Inst. 56 p. 1958. [From abstract in Dissertation Abstracts 19(7).]

Mammals were collected periodically throughout the year; associated plants also were collected seasonally and their tissues were prepared as reference material for histological identifications. Mammals, in order of abundance, were Mus musculus, Sigmodon hispidus, Rattus norvegicus, Oryzomys palustris, and Cryptotis parva. Food habits were studied for first 4; rice was the most used food for all; preferences for other species varied. Starches from seeds were of more importance for house mouse and rice rat, whereas Norway rat and cotton rat ate a mixed herbaceous and starchy seed diet.

Jellison, Wm. L., J. F. Bell, J. D. Vertrees, M. A. Holmes, C. L. Larson, and Cora R. Owen. (Sch. Pub. Health, 1 Shattuck, Boston, Mass.) PRELIMINARY OBSERVATIONS ON DISEASES IN THE 1957-58 OUTBREAK OF MICROTUS IN WESTERN UNITED STATES. Trans. 23d N. Am. Wildl. Conf.: 137-144. 1958.

An increase of rodents in n. Calif., w. Idaho, Nev., and s. Ore. began in summer, 1956, and by midsummer, 1957, resulted in great economic losses. The principal species was Microtus montanus. This irruption is being studied in

its public health, agriculture, wildlife, and economic aspects. Tularemia has been found in epizootic proportions in some areas and a streptococcal infection is quite common. Search is being made for other diseases. To our knowledge, this is the first opportunity in N. Am. for a detailed study of such a phenomenon.--Cora Owen.

Keys, Charles E. (Asbury Coll., Wilmore, Ky.) THE RATE OF DEVELOPMENT OF SIGMODON HISPIDUS AS COMPARED WITH SOME OTHER RODENTS. Trans. Ky. Acad. Sci. 19(1/2): 25-27. May 1958.

McCarley, Howard. (Austin State Coll., Nacogdoches, Texas.) THE EFFECT OF FLOODING ON A MARKED POPULATION OF PEROMYSCUS. J. Mamm. 40(1): 57-63. Feb. 1959.

Heavy rains in spring of 1957 produced flooding that covered 2 study areas that contained marked mice (Peromyscus gossypinus and P. muttalli). One study area was inundated for 1 week. This flooding had no detrimental effect on population size of the 2 species. The other study area was flooded for 3 weeks. This caused a 70% reduction in size of the combined species populations. On both plots, there was a remarkable tendency for resident mice to remain within their established home ranges as determined before and after flooding.--Author.

Rausch, Robert. (Arctic Health Res. Center, Anchorage, Alaska.) DISTRIBUTION AND SPECIFICITY OF HELMINTHS IN MICROTINE RODENTS: EVOLUTIONARY IMPLICATIONS. Evolution 11(3): 361-368. Sept. 1957. [From J. Mamm. 40(1).]

RATTUS AND MUS

Barnett, S. A. (Glasgow U., Scot.) BEHAVIOUR COMPONENTS IN THE FEEDING OF WILD AND LABORATORY RATS. Behaviour 9(1): 24-43, illus. 1956. [From Biol. Abst. 33(2).]

Feeding behavior was studied in R. norvegicus in small cages. 110 of the rats were wild, trapped in Glasgow or bred from rats so trapped; 34 were albinos. Offered a choice of minced liver, wheat grains, flour and sugar, rats usually ate some of each food; sugar was eaten least. Offered wheat plus either cod liver oil or aniseed oil, as against wheat plus arachis oil, consumption was almost altogether confined to the latter, even if, as nestlings, the rats had been given only the distasteful mixture. Both wild and albino rats show very marked exploratory and sampling behavior during feeding. This is a behavior pattern in its own right; not merely appetitive. Its biological function is to make possible rapid topographical learning, and reinforcement of such learning. Sampling is also important in enabling rats to associate particular physiological actions--favorable or unfavorable--with different foods. Exploration and sampling occur even when situation and foods are familiar, and regardless of age or sex. Sampling is not stopped by "satiation," but is released by it. In wild rats, but not albinos, there is highly developed flight and avoidance behavior; this tends to reduce the dangers of exploratory behavior. Both wild and tame rats tend to feed in cover. This enables one rat to rob another of food in the nest. Social influences on feeding are, however, only incidental, and usually a product of associated learning: there is no parental guidance of young, nor imitation by young of adults.--From auth. abst.

Davis, D. E. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) SOCIAL INTERACTIONS OF RATS AS INDICATED BY TRAPPING PROCEDURES. Behaviour 8(4): 335-343, illus. 1955. [From Biol. Abst. 33(2).]

Analysis of double and triple catches of Rattus norvegicus in box traps permits an examination of the interaction according to sex and to recapture status. It was found that in 518 double catches and 144 triple catches the number of pairs of males was significantly less than the number expected by chance (using single catches for an estimate of the true proportion of males). Results are interpretated to indicate that males repulse one another in agreement with the known belligerency of males. Similarly the simultaneous captures of marked and unmarked rats (when both belonged to the same sex) were less than expected by chance. These results are interpreted as indicating that a marked rat drives away an unmarked rat (if it belongs to the same sex). These interpretations cast doubt upon the applicability of recapture data for the estimation

of population since there is a tendency for marked rats to repulse unmarked. Also sex ratios calculated for multiple catches may be erroneous because males repulse males.--Auth. summ.

SCIURIDS

Koford, Carl B. (Apartado 1113, Humacao, Puerto Rico.) PRAIRIE DOGS, WHITEFACES, AND BLUE GRAMA. Wildl. Monog. no. 3. 1-78 p., 17 figs. Dec. 1958.

Cynomys ludovicianus exemplifies semiarid-grassland squirrels that have been extirpated widely because they cut forage. Colonies are characteristic of the short-grass association. They typically occur near moist sites on upland brown clay soils where slope is 2-15%. Density of burrows, commonly 25 per acre, depends on food supply. Dogs bury or remove 2-3% of the plant cover--more where forage is sparse. Av. breeding population of a town is 1 to 5 per acre. Counting young, population may be 10-15 per acre. Wide differences in numbers of young are caused by differences in numbers and fecundity of yearlings. Growth of young, survival over winter, and fecundity of yearlings apparently depend on supply of food in late fall and late winter. A town may double in area during one year, but expansions occur at irregular intervals. All towns in a region may not expand the same year. Unmolested, some towns remain about the same for many years, while others become depopulated. Long-term effects on grazing capacity depend on time and manner of cutting in relation to plant responses. In cold months, dogs remain underground much of time, but emerge occasionally and feed on seeds, cactus, shrubs, and storage organs of herbs. In summer, they cut, at height of a few in., nearly all herbage within 20 yards of burrows. Repeated clipping tends to eliminate shrubs and annual grasses. Cutting reduces mid-grasses in relation to short grasses; thus, prairie dogs tend to preserve their short-grass habitat. Cynomys seldom penetrate dense stands of tall perennial grasses unless these are opened by grazing. In mixed prairie, most towns occur where coverage of mid-grasses is low (25 to 50% of climax). Overgrazing by cattle lowers range condition and extends habitat favorable to prairie dogs; bison formerly filled this role. Local modification of timing and intensity of grazing could do much to reduce range damage by rodents. Understanding of relations among grassland plants and animals requires long-term studies. Such work is hindered by absence of large, natural, grassland preserves.--Author.

Landau, Barbara R., and Albert R. Dawe. (U. Wis. Med. Sch., Madison.) RESPIRATION IN THE HIBERNATION OF THE 13-LINED GROUND SQUIRREL. Am. J. Physiol. 194(1): 75-82. 1958. [From Biol. Abst. 33(2).]

See abst. in Biol. Abst. 33(2).

Longley, Wm. H. (Minn. Div. Game, Kasson.) THE PROBLEM OF GRAY SQUIRRELS. Cons. Volunteer 22(127): 56-61, 2 photos. Jan.-Feb. 1959.

In Minn., 3 mild winters in succession, combined with rather large crops of acorns, cut down on winter losses and promoted squirrel production. These conditions set the stage so that when food became scarce seasonally or locally, squirrels damaged trees by eating bark. Damage occurred either on young trees under heavy forest canopy, where production of squirrel food was limited, or in new housing developments where many kinds of food had been eliminated by clearing underbrush and ground cover. Scar tissue on injured trees is attractive to squirrels and promotes more chewing; this probably explains why chewing is confined to a limited number of trees instead of being distributed as a little eating on many. Lawn trees apparently have unusually tender growth, perhaps because they are watered and fertilized. Maple bark seems most attractive, perhaps because of higher sugar content and lack of strong chemical substances. Heavier squirrel harvest and an earlier season are recommended to help solve the problem.--L. F. Stickel.

Lyman, Charles P. (Harvard Med. Sch., Boston.) OXYGEN CONSUMPTION, BODY TEMPERATURE AND HEART RATE OF WOODCHUCKS ENTERING HIBERNATION. Am. J. Physiol. 194(1): 83-91. 1958. [From Biol. Abst. 33(2).]

See abst. in Biol. Abst. 33(2).

SCIURIDS—Continued

Manville, Richard H. (US F&WS, Natl. Mus., Wash. 25, D. C.) THE COLUMBIAN GROUND SQUIRREL IN NORTHWESTERN MONTANA. J. Mamm. 40(1): 26-45, 3 figs. Feb. 1959.

Natural history and status of Citellus columbianus in the region of Glacier Natl. Park are reviewed from observations made during 1954-5. The species is abundant and widespread throughout most of the Park. It attracts attention of casual visitors by its activity and is of special significance to biologists because of many interesting habits. Details are presented on habits, home site, social behavior, development, populations, dormancy and local distribution.--Auth. summ.

Mitchell, Ormond G. (Calif. St. Poly. Coll., Pomona.) THE REPRODUCTIVE CYCLE OF THE MALE ARCTIC GROUND SQUIRREL. J. Mamm. 40(1): 45-53, 12 photos. Feb. 1959.

The sexual cycle of Citellus undulatus consists of 4 periods: (1) spermatogenesis before breeding, (2) breeding, (3) involution, and (4) regeneration of testes. There is an annual aspermia from June to the following spring. Young of year have abdominal testes when they appear above ground during 2d week of July. Seminiferous tubules of juveniles contain no lumina and resemble those in early redeveloping adult testes. Histological changes within testes were correlated with observed activities of squirrels.--Author.

Provo, Marvin M. THE FUR VALUE OF THE MICHIGAN RED SQUIRREL. M.S. thesis, Mich. State U. 1952.

Pelts were taken from various Mich. counties. Prime pelts were taken from late Nov. through Feb. Jack-pine was the favored habitat. Av. value at market sale was 19¢ per pelt.--From auth. summ. supplied by G. A. Petrides.

Yeager, Lee E. (Colo. State U., Fort Collins.) STATUS AND POPULATION TREND IN FOX SQUIRRELS ON FRINGE RANGE, COLORADO. J. Wildl. Mgt. 23(1): 102-107. Jan. 1959.

Fox squirrels were hunted systematically on about 60 acres in 5 tracts in n.-cent. Colo., 1948-57. In all, 332 animals, 175 ♂♂ and 157 ♀♀, were collected. The highest av. kill per hunt, 4.8, was in 1953, which was judged to have the peak population of the 10-year period. This av. declined to 2.1 by 1958, mainly owing to habitat deterioration. In the kill, juveniles outnumbered adults 184 to 148. The kill av. 0.68 squirrel per acre per year. Habitat, restricted to wooded stream bottoms, and ditchbanks and fence rows planted to cottonwoods, is being reduced progressively by clearing, burning, and natural death of overmature trees; apparently it will become uninhabitable in 20 to 30 years. Fox squirrel foods in the region consist mainly of grains, buds, and bark. Squirrels occupying bottomland tracts which are grown to cottonwoods, and which adjoin agricultural lands, are favorably situated, as indicated by litter sizes and sustained yields comparable to those of the better midwestern ranges.--Author.

BEAVER

Allen, Jack. (Ind. Dept. Cons.) BEAVER - BOON OR BANE? Outdoor Ind. 1(8): 5-6. Feb. 1958.

Beaver were exterminated in Ind. before 1900. They were restocked in Kankakee drainage in 1935. Within 3 years they occupied 15 counties, and in 1957 they were in 43 counties, mostly in n. part of state. They were protected by law until 1951, when damage complaints became so numerous that an open season was declared. Prior to this, beavers that were causing damage were trapped and transplanted to new areas, thus increasing the speed of their spread. Prime beaver skins brought only $7-8, whereas the tag fee was $5, so trapping was not profitable. Tag fees were eliminated in 1957. Present law prevents removal of dams or beavers except by Fish & Game Div. personnel. It is recommended that permits for this purpose be issued to farmers suffering damage. There is no forseeable danger of beaver extirpation in Ind.--L. F. Stickel.

Provost, Ernest E. STUDIES ON REPRODUCTION AND POPULATION DYNAMICS IN BEAVER. Ph.D. thesis, State Coll. Wash. 85 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

"Data on sex and age composition of various populations [in Wash.] were compiled, together with observations on minimum breeding age and litter size. A general description of the gross morphology of the female urogenital system was given, and a tentative fetal growth curve, based on weight and hind foot length, was elaborated." Corpora lutea and corpora albicantia are easily recognized; within certain limitations both can be used as measures of reproductive performance, especially when correlations are established with fetal counts made just before parturition.

MUSKRAT AND NUTRIA

Łomnicki, Adam. (U. Krakow, Poland.) THE DAILY RHYTHM OF ACTIVITY OF THE COYPU, MYOCASTOR COYPUS. Folia Biol. 5(4): 293-306. 1957. [From Biol. Abst. 33(1).]

In Polish with English summ. The active period in experimental conditions lasts for about 5 hours in afternoon and evening.--A. Pigon.

Olsen, Peter F. (Wildl. Exp. Sta., Houghton Lake Heights, Mich.) MUSKRAT BREEDING BIOLOGY AT DELTA, MANITOBA. J. Wildl. Mgt. 23(1): 40-53, 5 figs. Jan. 1959.

This paper is concerned with young muskrats and with muskrat breeding biology as affected by interaction of density-dependent and density-independent factors during abnormally high water levels in 1955 and 1956. Av. litter size for the two years was 7.1 and 7.3 respectively, but varied with increasing age of litters and with progression of breeding season. Litters were 58% ♂♂; excess of ♂♂ rose with age of litters. Young grew very rapidly during the short period in summer when conditions were optimal. The rate declined rapidly after early fall, and little, if any, growth occurred Nov.-March. Initiation of breeding was correlated with temperature. This synchronization of initial breeding period, combined with a 28-day reproductive cycle, gave rise to peaks of litter production at 4-week intervals. Reproductive phenomena noted during the 2 breeding seasons exhibited rather marked departures from those considered normal for the region: the period of litter production was extended considerably, and much greater individual productivity was observed. In 1955 these irregularities were a compensatory response to severe mortality of early-born young. In 1956 they reflected psychological response to an uncrowded habitat.--Author.

Pridham, T. J., and E. L. Thackeray. (Ont. Vet. Coll., Guelph.) THE ISOLATION OF A STREPTOCOCCUS, LANCEFIELD'S GROUP D, FROM NUTRIA. Can. J. Comp. Med. & Vet. Sci. 23(3): 81-83. Mar. 1959.

Streptococcus durans causes disease sporadically in captive nutria. The disease may appear as either local or generalized infections.

BEARS

Black, Hugh C. (Cornell U., Ithaca, N. Y.) BLACK BEAR RESEARCH IN NEW YORK. Trans. 23d N. Am. Wildl. Conf.: 443-460, 4 figs. 1958.

209 bears were handled. 144 were trapped in culvert traps and 64 in steel traps. Trapping and handling techniques are described. Drugs were used in handling. Dosages for ether, pentobarbital sodium, and succinylcholine chloride, and methods and devices used for administration, are discussed. The No. 150 trap proved most effective. Mean weights of adult ♂♂ and ♀♀ were 240 and 189 lbs. Fifty-three of 141 tagged bears were recovered by retrapping, by hunters, etc. Loss of tags was insignificant. Bears not transferred were recovered an av. of 3.2 mi. from trap sites. Bears transferred before release were recovered many mi. from both trap and release points. An av. gain of 53 lbs. was recorded for bears not transferred. Gains for a year were negligible for 3 bears, and ranged up to 230 lbs. on a 332-lb. male that weighed 562 lbs. when recaptured. Gains of 92 and 81 lbs., both in 3 weeks, were noted.--Author.

Klein, David R., Willard Troyer, and Robert A. Rausch. (US F&WS, Juneau, Alaska.) THE STATUS OF THE BROWN BEAR IN ALASKA. Presented at 9th Alaska Sci. Conf., U. Alaska, Sept. 5, 1958. 11 p., processed.

A review of research being done under PR and with Forest Service. Census and research techniques are being studied in varied regions. Refuge boundaries on Kodiak Is. were changed in 1958 to include the 1-mi. marginal strip that was a source of conflict with cattle raisers. Certain other areas in a block were released for grazing. Annual kill on Kodiak was 171-225 during 1950-57; this is believed to be about right. Guide fees alone bring $100,000 annually to the town of Kodiak. About 10-12 additional bears are killed for food each year. Hide measurements and sex ratios did not change significantly 1951-57. Problems of observation and census are more difficult on the Alaskan peninsula and in se. Alaska. Aerial surveys and track counts have been made, but methods are not perfected. In se. Alaska a program is underway to study effects of logging on bears and to work out plans suitable for both. Av. litter sizes in the 3 areas were 2.2-2.4 for cubs of the year and 1.9-2.25 for yearlings.--L. F. Stickel.

Nováková, E. BEARS IN CZECHOSLOVAKIA. Schweiz. Z. Forstw. 109(3): 175-183, illus. 1958. [From Biol. Abst. 33(1).]

In German. In the mountains of western Slovakia, brown bears, almost extinct in 1930, have multiplied rapidly under protection. They live mostly on plants, fruits, and insects, according to season, though some individuals are carnivorous and kill untended domestic stock and wild game animals.--W. N. Sparhawk.

Steinbacher, Georg. ZUR FORTPFLANZUNGSBIOLOGIE DES BRAUNBÄREN (URSUS A. ARCTOS). Säugetierk. Mitt. 6(1): 27-28. Feb. 1958. [From J. Mamm. 40(1).]

RACCOON, RINGTAIL, COATI

Anon. RACCOONS AND THEIR CONTROL. US F&WS, Wildl. Leafl. 401. 2 p., 1 photo. Mar. 1959.

Discusses types of sets with steel traps and exclusion by fencing. Neither live traps nor the new quick-kill traps are mentioned.

Sundell, Robert Arnold. AGE DETERMINATION STUDIES OF THE RACCOON (PROCYON LOTOR LINNAEUS). M.S. thesis, Mich. State U. 1956.

Growth of the humerus, radius and ulna was studied in x-rays of captive raccoons between 2 and 30 months old. Maximum length offered the best basis for age estimation. Other studies showed useful age characteristics in closure of the rostral suture, sagittal crest development, tooth wear, shape and texture of baculum, and degree of epiphyseal fusion in foreleg.--From auth. summ. supplied by G. A. Petrides.

MUSTELIDS

Allen, Durward L. (Purdue U., Lafayette, Ind.) MINIATURE MARAUDER. Field & Stream 63(11): 85, 120, 122-123, 1 fig. Mar. 1959.

Popular article on weasels. Includes some interesting facts that are not universally known. In tests made by Arnold Haugen, weasels failed to kill rabbits in artificial burrows; rabbits safely bolted past them. Penned rabbits have been known to kill weasels by kicks. Weasels prey mainly on animals smaller than adult rabbits. They do not suck blood of prey--they may lap up a bit of it, but their food is largely flesh. It is true that they sometimes kill far more than they can eat, perhaps from instinct to store food. Kennicott found a pile of more than 100 rats and mice that a weasel killed in 2-3 days. Many animals will kill weasels. Foxes kill many but do not eat them. Latham found in Pa. that curves showing population fluctuations for foxes and weasels showed an inverse relationship, as if high fox population actually depressed weasel population. Whatever the reason, weasels are generally scarce and no control by man is needed.

Crisler, Lois. (Lake George, Colo.) "HE NOT SCARE A DAMN." Nat. Mag. 52 (4): 181-184, 3 photos. Apr. 1959.
First-hand observations, informally presented, on wild and captive wolverines. Includes notes on how wolverines perform some of their seemingly prodigious feats of strength, and on habits and disposition.

Harvey, Nancy E., and W. V. Macfarlane. THE EFFECTS OF DAY LENGTH ON THE COAT-SHEDDING CYCLES, BODY WEIGHT. AND REPRODUCTION OF THE FERRET. Australian J. Biol. Sci. 2(2): 187-199. 1958. [From Biol. Abst. 33(2).]
See abst. in Biol. Abst. 33(2).

Krott, Peter. DEMON OF THE NORTH. Alfred A. Knopf, 501 Madison Ave., N. Y. 22, N. Y. xv + 260 p., 40 photos, 2 maps. 1959. $5.00. Transl. from German by Edward Fitzgerald. Publ. in Sweden under title of "Tupu-Tupu-Tupu" and publ. under that title in Britain by Hutchinson & Co., London, 1958.
Here in the form of an interesting, biographical adventure story is the tale of Krott's life with wolverines. Basically, it is a popular account of a few years of the author's life in Scandinavia. Technically, one can pick up some worthwhile knowledge of wolverines while enjoying the narrative, and one can seek out and translate the author's scientific papers on the beast. Krott, graduate forester, found himself too engrossed with animals and too adventurous for forestry. He became a prosperous animal dealer in Helsinki, but revolted against the business. He opened a large nature park in Finland but could not get enough tourist trade. Then he persuaded the Swedish government and a Swedish naturalists' group to support him in studying wolverines on a government forest. He provided his own wolverines--some captured on a hard trip in n. Finland, some purchased from hunters. In all, he handled 31 young wolverines and reared several as members of his family. They grew so tame and affectionate Krott's children could play with them and visitors loved to feed them. Krott took them for long hikes in the forest and let them run free for days. He learned they could suck eggs with complete finesse, could crack the bones of a cow, could slay big game, would eat almost any animal living or dead, fed heavily on berries in season, and traveled huge distances. He also learned how utterly full of rough play and all sorts of mischief they were, and what vigor and determination they put into each activity. Territorialism of these solitary animals struck with full force when a wild ♂ ran Krott's young ♂♂ out of the forest reserve and into areas where townspeople encountered them. Fear and hatred of wolverines runs deep in Scandinavia. Posses formed in town after town. Mass meetings split communities and the controversy knocked foreign affairs out of the headlines. Krott's livestock dwindled, but he kept getting new wolverines and learning more about them. Results are blended with colorful stories of long hunts in Finland and hikes and ski trips in the Swedish mountains. Krott is now studying the rare Alpine bear in Italy.

MacLennan, J. M., translator. TRANSLATIONS OF RUSSIAN GAME REPORTS. VOL. 5. (SABLE AND SQUIRREL, 1951-55). Can. Wildl. Serv., Ottawa. 1-145 p., graphs. 1958 [1959]. $1.00, paper, from Queen's Printer, Ottawa, Ont., Can.
Contains eight papers: Fecundity of sables in natural conditions, by V. L. Zaleker. New data on winter diet of Yenisei sables, by I. D. Kiris. The sable in eastern Siberia, by V. V. Timofeyeff. Fecundity and winter diet of sables in Ivdelsk District in Sverdlovsk Province, by V. L. Zaleker and N. B. Poluzadoff. Canine distemper in sables, its prophylaxis and cure, by S. Ye. Sorina. Method of aerovisual survey of crop of squirrel-food and censusing several animals of economic value, by I. D. Kiris. Appraisal of trapping areas by results of the industry, by D. N. Daniloff. Squirrel migration in the USSR, Part I, by I. D. Kiris. Like volumes 1, 2 and 3 of this series, volume 5 consists of papers that originally appeared in the Russian annual, "Biology of Furbearers". The series should, of course, be in every good wildlife library. Unfortunately, the able translator, Dr. MacLennan, has retired because of illness: Enough material for a sixth volume remains, however, and we hope arrangements can be made to continue the series indefinitely.

Sankey, J. OBSERVATIONS ON THE EUROPEAN BADGER MELES MELES MELES (L.). S.E. Nat. Antiq. 1955: 20-34. 1955. [From J. Animal Ecol. 27(2).]
"Notes on habits, food, behaviour, voice, disease and growth rate from captive and wild animals. Describes an old badger pit."

Burkholder, Bob L. (US F&WS, P. O. Box 6123, Anchorage, Alaska.) MOVEMENTS AND BEHAVIOR OF A WOLF PACK IN ALASKA. J. Wildl. Mgt. 23(1): 1-11, 1 map. Jan. 1959.

A group of 10 Canis lupus was observed by air from March 11 to April 22, 1958. The group moved clockwise over an area 100 by 50 mi., mostly as a unit, and av. 15.5 mi. per day over the 45-day period for a total of 700 lineal mi. A total of 31 dead moose and caribou was located in the area; 22 of these were killed during the period of observation. Dall sheep were present but none was known to have been taken. Wolves av. 1 kill per 1.7 days. Av. distance traveled between kills was 24 mi. Wolves showed no preference between moose and caribou. They seemed to prey according to availability. No selectivity was noted in age, sex, or condition categories of caribou taken. Most moose taken were calves (in the ratio of 6:1), and the one exception was a yearling, although moose of older age classes were more abundant. No observations were made of animals that "got away"; however, none of the 22 fresh kills showed evidence of a long chase, nor did wolves, even singly, have difficulty catching healthy, adult, caribou. The pattern of attack appeared to be to surprise prey at close range and charge. There was no evidence that the wolves hamstrung their prey. Attack seemed to be at random, with bites taken whenever and wherever there was opportunity. Viscera, except for stomach contents, were eaten first; soft parts of neck and ribs were preferred over more massive tissues. Wolves were gregarious and showed no animosity or intolerance toward one another.--Author.

Davis, David E., and John E. Wood. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) ECOLOGY OF FOXES AND RABIES CONTROL. Pub. Health Rep. 74(2): 115-118, 1 graph. Feb. 1959.

A digest, with public health aspects emphasized, of results of 5-year study of fox populations in SE. Because of high birth and death rates, foxes are essentially an annual crop. Thus there are many new, susceptible foxes each year; increase in numbers may be rapid, even after reduction. Rabies outbreaks cannot be predicted satisfactorily from knowledge of prevalence of rabies in foxes, or from abundance of foxes, considering the small local scale on which it is feasible to study these matters. Reporting of human and animal cases of rabies still provides the best warning that preventive measures are desirable. Fox populations can be reduced by trapping, but we have yet to determine the effect of such reduction on prevalence of rabies. The land-use trend in the SE., from small farms to large tracts of timber and pasture, should reduce numbers of foxes and hence the amount of rabies.--From auth. summ.

Ellis, Ralph J., and Sanford D. Schemnitz. (Okla. State U., Stillwater.) SOME FOODS USED BY COYOTES AND BOBCATS IN CIMARRON COUNTY, OKLAHOMA 1954 THROUGH 1956. Proc. Okla. Acad. Sci. 38: 180-185. 1957 (1958).

Based on stomach contents of 16 coyotes and 10 bobcats. "It appeared that the bobcats tended to supplement the staple rabbit item with kangaroo rats and woodrats whereas the coyotes seemed to have supplemented the same staple with livestock flesh. Another difference suggested by the analysis was that the bobcats appeared to have eaten many more cottontails than they did jackrabbits. Coyotes, it seems, did the reverse."

Schmidt, T. THE WOLF IN THE RHENISH FORESTS. Bonn. Zool. Beitr. 8(3/4): 197-206. 1958. [From Biol. Abst. 33(2).]

In German. The history of the extermination of the wolf in western Germany, compiled from authentic sources.--J. H. Stock.

Stenlund, Milt. (Minn. Dept. Cons.) TIMBER WOLVES OF THE WILDERNESS. Animal Kingdom 62(1): 2-7, 3 photos. Jan.-Feb. 1959.

Popular presentation of technical material from author's bulletin on wolves in Superior Natl. For. in Minn. Topics include history in relation to forest history, food habits, population density, weights, travel and hunting habits, dens, litter size, sex ratios, ages, relation to deer populations, etc. For abstract of Minn. Dept. Cons. Tech. Bul. no. 4, 1955, on which this paper is based, see WR 84 p. 25.

Tembrock, Günter. BEWEGUNSSTEREOTYPIEN BEIM ROTFUCHS. Zool. Garten 22(3): 179-196, illus. 1958. [From J. Mamm. 40(1).]

Tomlinson, A. R. AERIAL BAITING AGAINST WILD DOGS AND FOXES IN WESTERN AUSTRALIA. J. Agr. W. Australia 3(1): 37-49, illus. 1954. [From Biol. Abst. 33(1).]

Details of preparing and dropping bait are given. It is suggested that aerial baiting be used in close conjunction with, and in extension of ground baiting.--T. W. Embleton.

Trefethen, James B. (Wildl. Mgt. Inst., Wire Bldg., Wash. 5, D. C.) ANOTHER VANISHING AMERICAN. Am. For. 65(1): 17, 48-49. Jan. 1959.

The story of the campaign against wolves in Am. since colonial days. Today there are only a few hundred left in the U. S., and most of these are the red wolf. There are remote areas in which we need wolves to help control game herds, but wolves are in danger of extermination everywhere s. of the Canadian line and in a number of places n. of that line. "It is not outside the realm of possibility that some form of refuge specifically for the wolf will be established either in the United States or Canada before many more years have passed. If the wolf is to be preserved as a part of the American fauna, such action cannot be delayed too long."

Wood, John E. (Jacksonville U., Fla.) RELATIVE ESTIMATES OF FOX POPULATION LEVELS. J. Wildl. Mgt. 23(1): 53-63, 1 graph. Jan. 1959.

Relative numbers of red and gray foxes were estimated in large areas of the Coastal Plains of the se. states by a series of standardized trap lines placed along primitive roads. Traps were placed at 0.2-mi. intervals and lines were run for 7 days. This spacing was the most efficient in sampling populations with a minimum of immigration. Comparisons between areas were statistical analyses based on the proportion of trap stations that caught foxes. Seasonal mobility in the population is suggested by the proportion of stations capturing foxes: spring, 14.0; summer, 12.0; fall, 23.5; winter, 22.4. Increase in the trap-contact was due in part to increased movement and in part to addition of young foxes. Little difference was noted between fox populations of widely separated areas, or of successive years in the same areas. This shows that fox populations of se. Coastal Plains are quite homogeneous. Evaluation of control campaigns was made in 5 counties by sampling before and after control. The census trap lines proved satisfactory for evaluation. They showed that control measures were temporarily quite effective in some areas.--Author.

CATS

Baron, Alan, C. N. Stewart, and J. M. Warren. (U. Oregon, Eugene.) PATTERNS OF SOCIAL INTERACTIONS IN CATS (FELIS DOMESTICA). Behaviour 11(1): 56-66, illus. 1957. [From Biol. Abst. 33(2).]

See abst. in Biol. Abst. 33(2).

Erickson, Albert Wendell. AN ECOLOGICAL STUDY OF THE BOBCAT IN MICHIGAN. M.S. thesis, Mich. State U. 1955.

Analysis of stomach contents showed that deer were the most important food throughout the year. Hares and rabbits were next, then porcupines and squirrels. Mice, moles, shrews, birds, beavers, skunks, and weasels were minor foods. Tracking studies showed that only 1 of 3 deer killed was a healthy animal. 88% of the deer found eaten in the field were carrion. It was concluded that the bobcat is not a serious predator of deer. Tracking observations showed a daily cruising radius of 1.4 mi., a daily cruising distance of 4.4 mi., and a home range of 15-20 sq. mi. Breeding season of older animals extended from Jan. through Mar. First-year breeders might breed as late as May. Age was determined from corpora lutea, ovarian volumes, and body weights. More ♂♂ than ♀♀ were trapped, but whether ♂♂ actually predominated in the population is uncertain.--From auth. summ. supplied by G. A. Petrides.

Lindemann, W. THE EARLY DEVELOPMENT OF THE LYNX (LYNX LYNX) AND THE WILDCAT (FELIS SILVESTRIS). Behaviour 8(1): 1-45, illus. 1955. [From Biol. Abst. 33 (2).]

In German. The maturation of inborn behavior and the development of acquired abilities are observed with special attention to locomotion, movement when attacking and being attacked, to resting positions, feeding behavior, and deposition of feces and urine. A detailed investigation is made of the relationship of mother to young and young to young. Sensory capacities could be examined in detail in the lynx only. Reaction to enemies, orientation, and homing abilities, were also investigated. In general, the lynx can be judged to be the more intelligent species and one of a fairly high differentiation.--A. P. M. Sanders.

Sheldon, Wm. G. (U. Mass., Amherst.) A LATE BREEDING RECORD OF A BOBCAT IN MASSACHUSETTS. J. Mamm. 40(1): 148. Feb. 1959.

Wright, Bruce S. (NE. Wildl. Sta., Wildl. Mgt. Inst., Fredericton, N. B.) THE GHOST OF NORTH AMERICA / THE STORY OF THE EASTERN PANTHER. Vantage Press, 120 W. 31st St., N. Y. 1, N. Y. 140 p., illus. 1959. $3.50.

Writing for the public as much as for biologists, Wright tells how panthers were killed out in eastern America and were starved out by extirpation of deer. Only in a few remote, hard-to-hunt areas did they persist. There they hung on in such small numbers that some nuclei were overlooked for many years. Finally modern man restored deer herds in many states and provinces and the panther slowly increased and spread. Today, Wright is convinced, panthers occur as residents or travelers in most states from New Brunswick through Fla., as well as in Minn. and Mo. [Sealander, 1956, says they never were extirpated from Ark.] Wright presents detailed accounts of many records, and tells just how he collects, evaluates, and interprets sight records. He also gives much information on the application of tracking techniques and analysis of data from kills. He shows how to study tracks to get information about sex, age, speed of travel, and freshness of tracks. Calls of the panther are discussed, and suggestions are given for attracting the cats by calls and by lures, and for recording their presence with camera traps. One chapter tells the story of the Nashwaaksis panther of N. B. as Wright reconstructed it from pieces of evidence. Another chapter is a concise review of the biology and natural history of the species. Today our eastern panthers are exceedingly retiring, wary, and rare. They rarely attack livestock and are no threat to our deer herds. We should give the species every protection where it is rare, and we should give it the status of a game animal elsewhere--except on Vancouver Island, where it is, or has been, overly abundant and dangerous. Above all, we should do our best to stop the practice of getting up a posse to slay the beast every time a panther is reported. Instead let us protect the animal so that we can know "that the woods and forests may hold something of the old--something akin to grandeur--that we all thought was gone."

BIG GAME, GENERAL

Anon. THE PRONGHORN ANTELOPE. Outdoor Calif. 19(12): 10-12, 2 figs. Dec. 1958.

Pronghorns in Calif. were down to 1000 in 1924. Since then, with nearly constant protection, they have increased only in a few nw. counties and have disappeared from some counties. Now there are 2165 in 4 counties and small herds in 3 other counties. There has been no increase in recent years. Herds in adjacent parts of Nev. and Ore. have declined. Reasons are not clear. Formerly technicians believed that forage could not be the trouble, for there was plenty of sagebrush, and that perhaps predators were responsible. Now indications are that predation is not important and that forage conditions are inadequate in some way. Apparently the present range has all the antelope it will carry. Removal of about 280 old ♂♂ would lighten pressure on the range and make things better for does and kids. The 1958 survey showed 70 kids and at least 59 bucks per 100 does. Half as many ♂♂ would be enough. Some hunting might also compensate for some of the damage pronghorns do in breaking down fences and attacking crops.

Bonner, W. Nigel. THE INTRODUCED REINDEER OF SOUTH GEORGIA. Falkland Islands Dependencies Surv. Sci. Reps. 22: 1-8, illus. 1958. [From Biol. Abst. 33(3).]

Account of the introduced reindeer living in a feral state in S. Ga. The diet consists largely of tussac grass, Poa flabellata, with a large proportion of short herbs during snow-free months. Lichens form an insignificant part of the diet. Hunting of reindeer for food is described. Systematic hunting by whaling companies may cease altogether in the near future, which may necessitate occasional reduction of herd.--From auth. summ.

Burckhardt, Dieter. OBSERVATIONS SUR LA VIE SOCIALE DU CERF (CERVUS ELAPHUS) AU PARC NATIONAL SUISSE. Mammalia 22(2): 226-244, 1 pl. June 1958. [From J. Mamm. 40(1).]

Contor, Roger. (Rocky Mtn. Natl. Park, Colo.) BIGHORNS OF ROCKY MOUNTAIN. Natl. Parks Mag. 33(137): 7-9, illus. Feb. 1959.

The bulk of this short paper is a popular account of bighorns in Rocky Mtn. Natl. Park. The last few paragraphs state that the herd has dwindled from perhaps 1000 in 1920 to about 329 in 1939 to about 210 today. Three factors are considered responsible: 1. Animals are barred from lowland winter range. 2. Lungworms, coccidiosis, and hemorrhagic septicemia kill sheep steadily and probably account for the heavy loss of lambs. 3. Winter competition with elk: elk increase, bighorns do not. On eastern slope of park, where competition was greatest, bighorns decreased 78% in 19 years; this situation is being corrected through management.

Darling, F. Fraser. (Cole Park, Malmesbury, Wiltshire, Eng.) CONSERVATION AND THE UNGULATES. Mammalia 22(2): 317-322. June 1958. [From J. Mamm. 40(1).]

Denney, Richard N. (Colo. Dept. Game, Carbondale.) SEX DETERMINATION IN DRESSED ELK CARCASSES. Trans. 23d N. Am. Wildl. Conf.: 501-513, 4 figs. 1958.

1,176 measurements made at check stations in Colo. during the 1957 season showed that in 747 bull elk the conjugate diameters (of the pelvis) av. 5.77 inches and that in 429 cows the conjugate diameters av. 6.78 inches. Several other measurements were taken in conjunction, and there was found to be an overlap in conjugate diameters. Other useful sex characteristics, in cases of overlap, are: the pizzle-eye, cross-section and length of the pubic symphysis, character of scrotal and udder fat, exposure of the gracilis muscle, color and size of hides, width and weight of canines, darkness of flesh, and general conformation of gross physical make-up. Further work on measurements and correlative factors is indicated.--Author.

Edwards, R. Yorke, and Ralph W. Ritcey. (Dept. Recreation & Cons., Victoria, B. C.) MIGRATIONS OF CARIBOU IN A MOUNTAINOUS AREA IN WELLS GRAY PARK, BRITISH COLUMBIA. Can. Field-Nat. 73(1): 21-25. Jan.-Mar. 1959.

Rangifer arcticus in Wells Gray Park migrates between alplands above 7,000 feet and lowland coniferous forest at 3,500 feet. Migrations differs from those of deer and moose, which descend in autumn and ascend in spring. These caribou move down in late autumn, climb in Jan. to winter near treeline, move down again in April, and climb again in May or June. Factors controlling these migrations appear to be available food supply as affected by snow, and the influence of snow upon movement of the animals. At timberline in winter, deep firm snow makes available an abundance of arboreal lichens.--From auth. summ.

Flyger, V. F. (Box 1510, Annapolis, Md.) MARYLAND'S NEW DEER CITIZENS. Md. Cons. 36(2): 23-25, 2 figs. Mar. 1959.

Four or five sika deer were released on James Is., Dorchester Co., about 1916. By 1957 there were more than 270 of these deer on the 280-acre island. Some swam to Taylors Is. Others reached the mainland and are spreading. This Asiatic deer is more wild, nocturnal, and secretive than our native deer--so much so that it is not considered a good game animal. Sika are so secretive that local people may be unaware of their presence for years. Sika also compete with other deer for food and, in Europe, tend to bark trees. They have quite a variety of calls, including a breeding-season scream. They may travel in large herds of up to 60 animals. Distinctions between sikas and whitetails

are described. Another exotic deer in Md. is fallow deer on Mills Is. in Chincoteague Bay. This species is highly vulnerable to hunting and probably would not persist on the mainland. Sikas, however, are apt to multiply and spread, for hunters will be unable to bag many unless tactics are employed that are not used on whitetails in Md.

Hanson, R. P., and Lars Karstad. (Vet. Sci. Dept., U. Wis., Madison 6.) FERAL SWINE IN THE SOUTHEASTERN UNITED STATES. J. Wildl. Mgt. 23(1): 64-74, 4 maps. Jan. 1959.

Feral swine range over about 145,000 sq. mi. of the Coastal Plain of the se. U. S. They probably number about 1,500,000. In behavior and conformation they resemble unimproved domestic hogs. Their importance to livestock owners is due to their adverse effect on improved blood lines by interbreeding with domestic swine and to their potential as hosts for perpetuation of livestock diseases. Wildlife managers and foresters usually consider feral swine to be a nuisance because of their destructive effects on game habitat, young trees, and wildlife food plantings, and because of their direct competition with native fauna for food. Their value as game animals is minimized by their close relationship to domestic swine. Habits of the swine are discussed. While relatively little is known about the diseases of feral swine, these animals are known to be hosts to several helminth, arthropod, viral, and bacterial parasites. Their close association with wildlife and domestic stock makes them at least potentially important as reservoirs for diseases of other animal species. The extensive range of these animals and their great numbers in many areas make them worthy of more consideration than they have been given.--Authors.

Jaczewski, Zbigniew. REPRODUCTION OF THE EUROPEAN BISON, BISON BONASUS L. IN RESERVES. Acta Theriol. 1(9): 333-376, illus. 1958. [From Biol. Abst. 33(3).]

Successful matings may occur over the whole year, but are most frequent in August and September. As the pregnancy lasts for 260-270 days, births are in May-June. Estrus occurs usually 40-80 days after calving, but may occur as early as 22 days. If the cow was not covered, the heat period comes again in 10-70 (usually 20-30) days after the first. Sexual maturity is reached at the age of 3 years, but there are cases of younger animals being able to reproduce (a bull at 15 months). Observations of bisons were in Polish reserves and on pedigree registers.--A. Pigon.

Janda, Miroslov. DIE NAHRUNG DES SCHWARZWILDES, SUS SCROFA L., IM MITTELGEBIRGSGEBIET VON STIAVNICA. Säugetierk. Mitt. 6(2): 67-74. Apr. 1958. [From J. Mamm. 40(1).]

Lang, E. M. (N. M. Dept. Game.) ELK OF NEW MEXICO. N. M. Dept. Game & Fish, Bul. no. 8. vi + 33 p., illus. 1958.

History, biology, ecology, and management in N. M. The Rocky Mtn. race in n. part of state, and Merriam elk in s. part, were exterminated by early 1900's. Introductions since then (table in appendix) were of the n. form. Map shows present distribution in N. M. First hunt was in 1933. 1151 permits were issued in 1957 and 423 elk were harvested. Management is by control of harvest. Status of herds is evaluated from winter aerial surveys,bugling counts, sign surveys, and kill data. Biological data are primarily from N. M., although reports from other areas are cited. Topics include: weights by years and antler points, measurements, antler growth and shedding, breeding behavior and reproduction, longevity, foods and feeding habits, habitat preferences, travels, predation, diseases and parasites, behavior, and habits. Yearling bulls have spikes, 2-year olds have 4-5 tines, and 3-year olds have 5-6 tines. From 4 to 10 or 12 years there are 6 tines and the antlers increase steadily in diameter and length. Elk breed in second year; gestation period is 250-263 days; best age for production is from 4-9 years. Young, usually singles, are born in May or early June. Few elk that pass through checking stations are more than 10 years old.--L. F. Stickel.

Lubinsky, G. (McGill U., Macdonald Coll. P. O., Quebec.) OPHRYOSCOLECIDAE (CILIATA: ENTODINIOMORPHIDA) OF THE REINDEER (RANGIFER TARANDUS L.) FROM THE CANADIAN ARCTIC. II. DIPLODINIINAE. Can. J. Zool. 36(6): 937-959, 39 figs. Dec. 1958.

Mohler, Levi L., Paul D. Dalke, and Wesley M. Shaw. (Idaho Game Dept., Boise.) ELK AND ELK HUNTING IN IDAHO. Trans. 23d. N. Am. Wildl. Conf.: 491-500. 1958.

History of elk population trends and hunting seasons; description of major habitat types; discussion of the changing habitat and inventory methods; harvest data for 1937-57, inclusive; hunter success. Elk are now in at least 40 Idaho counties. Population gained rapidly from 1920's to more than 60,000 by 1954. High populations built up in extensive shrub areas which developed after great fires of 1910, 1919, and 1934. Either-sex seasons yield almost equal numbers of ♂♂ and ♀♀. Computed annual kill was above 12,000 annually for each year in 1953-57 period. Getting adequate harvest in remote areas is a major management problem.--L. L. Mohler.

Morrison, John A., Charles E. Trainer, and Philip L. Wright. (Idaho Dept. Game, Boise.) BREEDING SEASON IN ELK AS DETERMINED FROM KNOWN-AGE EMBRYOS. J. Wildl. Mgt. 23(1): 27-34, 4 figs. Jan. 1959.

Eight known-age elk embryos and 1 term calf were obtained from elk bred under observation. Embryo ages were 25, 30, 37, 43, 59, 90, 123, and 182 days; age of the term calf was 247 days. Specimens were weighed, measured, and their morphology was described. A growth curve was constructed from crown-rump length. Use of growth curve was illustrated by aging embryos from 2 groups of free-ranging elk and estimating their av. conception dates. These dates were Oct. 3 in one group, Oct. 6 in the other. Placental cotyledons and chorionic villi developed similarly to those in cattle.--J. A. Morrison.

Neal, Bobby J. (U. Ariz., Tucson.) A CONTRIBUTION ON THE LIFE HISTORY OF THE COLLARED PECCARY IN ARIZONA. Am. Midl. Nat. 61(1): 177-190, 2 photos. Jan. 1959.

Data were obtained Sept. 1955 to Jan. 1957, chiefly in Tucson Mtns. Breeding apparently occurs in all months. 74% of young are born June-Aug. Av. litter size is about 1.5, but ♀♀ have 4 functional and 4 rudimentary mammae. Weight at birth is about 1 lb. 31 adult ♀♀ av. 45.7 lbs. and 17 adult ♂♂ av. 43.8 lbs. Two young captives grew adult pelage by age of 4 months. Loss of young was heavy in the wild. Peccaries normally live in herds, but some ♂♂ are solitary. Scent gland is used in communication and mating behavior. Few ectoparasites were found. Main food is prickly pear pads.--From auth. summ.

Neal, Bobby J. (U. Ariz., Tucson.) TECHNIQUES OF TRAPPING AND TAGGING THE COLLARED PECCARY. J. Wildl. Mgt. 23(1): 11-16, 1 photo. Jan. 1959.

Peccaries (Pecari tajacu) were captured in corral traps and in large, aluminum, panel traps built for deer. Nembutal, Surital and chloroform were used to anesthetize the animals. Experimental dosages for these drugs are reported. Animals were marked with aluminum cattle tags and plastic ear discs. Tattoo markings, chemical brands, and paints were tried as markers but were of little value.--Author.

Owen, Ray D., C. Stormont, and M. R. Irwin. (U. Wis., Madison.) STUDIES ON BLOOD GROUPS IN THE AMERICAN BISON (BUFFALO). Evolution 12(1): 102-110. 1958. [From Biol. Abst. 33(3).]

See abst. in Biol. Abst. 33(3).

Rausch, Robert A. (Box 6123, Anchorage, Alaska.) NOTES ON THE PREVALENCE OF HYDATID DISEASE IN ALASKAN MOOSE. J. Wildl. Mgt. 23(1): 122-123. Jan. 1959.

Examination of 124 pairs of lungs from moose collected from 2 populations in s.-cent. Alaska revealed that the lungs of 20% were infected with hydatid cysts, Echinococcus granulosus, and that there was a significant difference in the prevalence of the disease between the 2 areas. In infected populations, incidence of infection is greatest in the oldest age groups.--Author.

Semyonoff, B. T. NUMERICAL CENSUS OF EUROPEAN ELK (MOOSE) BY SURVEY OF TRACKS FROM THE AIR. Translation by J. M. MacLennan, Can. Wildl. Serv., 22 p., processed, from Voprosy biologii Pushnykh Zverey (Moscow), 1956, starting p. 72. Single copies of transl. available on request to Can. Wildl. Serv., Ottawa, while supply lasts.

Trials prove that the moose themselves cannot be counted from the air because trees conceal them and the beasts will not flush from the plane. It is practical,

however, to estimate populations from aerial counts of tracks in snow. This paper tells how track patterns are related to daily and long-term movements of moose, and how to make population estimates from them. The author then shows how he has estimated moose density and total numbers for the huge province of Archangel. In general, density seems to run from about 1.4 to 1.8 moose per 1,000 hectares, or about 3 sq. mi. The technique of counting tracks from airplane is considered the quickest and cheapest way of censusing moose populations of large forested areas. Such counts, made in sample districts, should be used to correct results of questionnaires sent to foresters and trappers in many districts.

Shaposhnikoff, F. D. (Dept. Game Preserves & Hunting, Ministry Agr., USSR.) ECOLOGY AND MORPHOLOGY OF THE ALTAI REINDEER. Translation by J. M. MacLennan, Can. Wildl. Serv., 23 p., processed, from Zool. Zh. 94(1): 191-207. 1955. Single copies of transl. available on request from Can. Wildl. Serv., Ottawa, while supply lasts.

Text takes up description of this race of reindeer, range, rarity, seasonal habits and habitats, general habits, and need of protection from man and predators. Food supplies apparently are considered ample. Long tables present detailed measurements of 5 specimens, comparisons with certain domesticated breeds, and a list of food plants with indication of usage.

Sonnenfeld, J. (U. Delaware, Newark.) AN ARCTIC REINDEER INDUSTRY: GROWTH AND DECLINE. Geog. Rev. 49(1): 76-94, 2 figs. Jan. 1959.

Detailed, documented history of the reindeer venture in n. Alaska.

von Lehmann, Ernst. DIE AUSWIRKUNG DER BERGMANN'SCHEN REGEL INNERHALB DER GRUPPE DER HOLARKTISCHEN CERVIDEN. Säugetierk. Mitt. 6(2): 49-51. Apr. 1958. [From J. Mamm. 40(1).]

White, Robert W. (Ariz. Game Dept.) ELK SURVEY SYSTEMS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 227-230. 1958.

Until 1946, Ariz. had no systematic elk survey method. At that time it began using 1-day spot counts in different areas to determine trend. Suspicion about this method arose when it was noted that the trend count could be down as much as 49% below the previous year and then go up 78% in the next year. To test this, series of repeat counts were made in certain areas. Counts made on 7 consecutive days varied as much as from 0 to 32 elk. It was found that "a total of 14 repeat counts on each area would be required at the 90% confidence level in order to detect a minimum population increase or decrease of 25%." Probably the 90% confidence level is unnecessarily high, but even if the 70% level is accepted, it would take 5 counts in an area to detect a population change of 30%. Considering time, distance, number of areas, etc., this is prohibitive. Another method is necessary. The one being tried depends on the fact that elk summer range in Ariz. is limited. Pellet counts will be made along parallel transects in areas frequented by elk. Pellet counts will be calibrated by repeated counts of elk. If this system works, it will be extended throughout the elk summer range. Transects would be cleared of pellets in middle of May and pellet groups would be counted in middle of June. Use of this system would take even less time (about 60-man-days per year) than the present unsatisfactory system.

Yeager, Lee E., and Richard N. Denney. (Colo. State U., Ft. Collins.) RAIN AND THE GAME. PART II. BIG GAME. Colo. Outdoors 7(7): 28-31, 4 photos. Jan.-Feb. 1959.

Rain makes the browse grow. Snow covers it up. When the Cache la Poudre range of Colo. gets good rainfall, there is 200% to 400% more winter browse than after a dry year. On the W. Slope of Colo., heavy snow in winter of 1956-7 followed a dry year. There was little browse, and it was covered by snow. Nearly 50% of some herds died--bucks, does, fawns. Shortage of winter food causes migration, and this leads to heavy mortality from roads, streams, fences, predators--and it may take deer only to ranges overused by livestock. A good year for browse obviates the need for much travel and puts the deer in better condition for reproduction. The resultant increase may show up in the population for 4-5 years. A good deer range such as the Cache la Poudre has several

features: large area, with plenty of altitudinal range; range in good condition from proper management; herd held within carrying capacity by adequate kill. This range has little winter loss. Snow also affects hunters and the kill. A little snow helps hunting and reduces fire hazard. Heavy snow drives out hunters and reduces kill where kill is most needed.

Yoakum, James, secretary. (P. O. Box 306, Vale, Ore.) PROCEEDINGS OF THE 1958 ANNUAL INTERSTATE ANTELOPE CONFERENCE, SEPTEMBER 17, 18, 1958, SHELDON NATIONAL WILDLIFE REFUGE, NEVADA. (Cover title: 1958 Transactions, Interstate Antelope Conference, Sheldon Antelope Refuge, Nevada.) ii + 63 p., illus. [1959.]

This mimeographed volume is the first report of pronghorn conferences that began in 1949. The 1958 conference was attended by 19 state and federal workers from Pacific Coast states and Nevada. Papers presented in the volume are: Annual report--Oregon, by Johnny McKean. Airplane dye-marking experiment on pronghorn antelope, by Bill Lightfoot. California band composition 1958, by Ed Schneegas. California antelope count for 1958, by Stan Thompson. Nevada fish and game report, by Bill Foree. Status of the Hart Mountain antelope herd, by Bob Watson. Four-state antelope meeting report, by Ben Hazeltine. Antelope management planning at the Hart Mountain and Sheldon National Antelope Refuges--1958, by Ock Deming. Seasonal food habits of the Oregon pronghorn antelope, by Jim Yoakum. Several of these papers are more detailed and informative than their titles may suggest. In addition, the informal discussions are summarized.

DEER (Odocoileus)

Allen, Jack. (Ind. Dept. Cons.) INDIANA WHITE-TAILS--THEIR PLIGHT AND PROGRESS. Outdoor Ind. 2(5): 6-9, map, sketch. Nov. 1958.

Deer were absent from Ind. from 1893 until re-introduced in 1934. Present herd is about 10,000, third lowest of all 49 states. For many years about 20% of the annual increase was taken by poachers, but this drain has been reduced. Annual herd increase now is 30-35%. In the first 2 open seasons, 1951 and 1952, both bucks and does could be shot. Result was that the Harrison forest herd was wiped out and a strip-mine herd nearly so. "Indiana became the first state in history to knock out 80 to 90 per cent of an established herd in a legal open season." There was too much hunting pressure for the small herds. From 1953-1956, hunting of bucks was allowed in s. counties, but with little success or hunter interest. Season was closed in 1957 and efforts were concentrated on intensive enforcement and transplanting. Herd increased 30% by 1958. In addition, deer moved s. from Mich. into agricultural areas in n. of state, where they may produce a damage problem and where hunting on farms may be troublesome. A 3-day buck season was authorized for most counties for 1958. Its outcome would determine future regulations.--L. F. Stickel.

Bartlett, Charles O. A STUDY OF SOME DEER AND FOREST RELATIONSHIPS IN RONDEAU PROVINCIAL PARK. Ont. Dept. Lands & For., Tech. Bul., Wildl. Ser. no. 7. vi + 172 p., 17 figs. Dec. 1958.

Deer were re-introduced around 1900, and had almost completely removed forest regeneration by 1920. There were about 500 deer (110 per sq. mi. of habitat) in the 8-sq. mi. park in 1910. Deer numbers were kept at a lower level, an av. of 20 per sq. mi., from 1938 to 1952 to allow the forest to recover. Browse studies indicated that this number has no bad effect on regeneration of most trees and shrubs. It is recommended that deer be held at 50-75 animals until there is a little more time for less abundant or more desirable species to become established, then maintained at or below 100. Browse surveys showed further that deer try to get variety in their diets and to equalize amounts of different kinds of plants. The result is that low-availability plants are browsed more heavily than high-availability plants. Palatability studies showed no marked preferences. Survival of plant species under heavy deer pressure is the result of ability to withstand excessive and repeated browsing and does not depend on palatability. A second, related, part of this study was an ecological analysis of the park's forests and their history. This is reported in detail. The pine-oak type originated mainly after fires and cutting from 1844 to 1894. The beech-maple type, in contrast, is a many-aged stand with trees up to 280 years old. It will be necessary to do clear cutting of certain areas of the forest if the pine-oak type is to be perpetuated. Experimental cutting by different plans is recommended.--L. F. Stickel.

Bennett, A. L. (Armstrong For. Co., Johnsonburg, Pa.) DEER MISMANAGEMENT--A THREAT TO SUSTAINED YIELD FORESTRY IN PENNSYLVANIA. Proc. Soc. Am. For. Meeting 1957: 101-104, 4 figs. 1958.

The uncontrolled deer population is making forest management almost impossible by eating the young growth, seedling or sprout. The herd itself suffers stunting and heavy winter kill. But modern forestry practices are extremely favorable to deer production. Forestry implications of the situation are brought out clearly. "It is my belief that the present state-wide deer herd, estimated to be upwards of 400,000, should be reduced to half its present size so that on the average one animal would not occupy less than 40 to 50 acres of forest land. This may mean eliminating three out of every four deer in areas where population levels of one deer to 8 to 15 acres are known to exist." Control by any-deer hunting season is recommended. State's management of its own forest and game tracts is criticized as inadequate.

Bissell, Harold. (Calif. Dept. Game.) INTERPRETING CHEMICAL ANALYSES OF BROWSE. Calif. Fish & Game 45(1): 57-58. Jan. 1959.

We may be seriously underestimating the true nature and quality of deer browse. Rumen contents of deer studied averaged 17.6% crude protein. But young terminal samples from same species of plants eaten by deer in same area averaged only 6.9% protein. A rerun gave similar results. Test of captives fed alfalfa pellets showed that deer were not enhancing protein content--or at least not much. "The implications are: (1) the deer either select vegetation which is approximately two to three times higher in protein than is generally supposed; or, (2) the protein content of the rumen is enhanced to a very high degree by some factors not now apparent. The alfalfa pellet experiments indicate that the first is more likely."

Brunett, Louis. (La. Wild Life Comm.) MANAGING DEER HERDS. La. Cons. 11 (2): 14-16, 24, 5 photos. Feb. 1959.

Good popular article on why deer herds often need control, what heavy kills they can sustain, and why any-deer hunting is the best solution to deer control.

Christensen, Earl M. (Brig. Young U., Provo, Utah.) A HISTORICAL VIEW OF THE RANGES OF THE WHITE-TAILED DEER IN NORTHERN WISCONSIN FORESTS. Am. Midl. Nat. 61(1): 230-238. Jan. 1959.

Early records of n. Wis. forest conditions are assembled and used as the basis for reconstructing the ecological history of the deer herd. When white men came, the forested uplands provided rather low-grade summer range. Lowlands, however, were covered with fine winter range, including great swamps of white cedar. There was no shortage of prime winter range, but deer were not abundant. In the next stage, logging of uplands improved summer range and there was still plenty of good lowland winter range. Deer became abundant. But in the late 1800s swamps began to be cut, burned, and drained. The herd declined. By 1920 the swamps were in bad shape. The reduction of winter range was not noted because deer were then low, owing partly to overhunting. Protection of forests and deer in 1920s and 1930s caused increase. Herd reached peak in late 1940s. Then overbrowsing of winter range was general. It became apparent to experts in the 1930s that shortage of winter range would limit deer densities. This shortage will remain the limiting factor for some time to come.

Gilbert, Paul, and John Harris. (Colo. Game Dept.) HOW FAR DO DEER TRAVEL? Colo. Outdoors 8(2): 18-20, 2 photos. Mar.-Apr. 1959.

1,631 deer have been tagged since Colo. started this work in 1948, but only 193 tags have been returned. Distances between points of tagging and shooting varied from 0 to 70 mi., with av. of 12.5 mi. Young bucks traveled farthest. Deer usually returned to same winter and summer areas year after year. Herds usually were pretty well separated into bands by drainages. Deer tagged on 1 side of a large river generally summered on the same side. Live weights are tabulated for sex and age groups. Notes are given on trapping techniques.

Gill, John Delmont. REGIONAL DIFFERENCES IN SIZE AND PRODUCTIVITY OF DEER IN WEST VIRGINIA. M.S. thesis, Mich. State U. 1955.--From auth. summ. supplied by G. A. Petrides.

See WR 86 p. 52 for abstract of publication.

Gill, John. (Maine Dept. Game, Orono.) EFFECTS OF PULPWOOD CUTTING PRACTICES ON DEER. Proc. Soc. Am. For. Meeting 1957: 137-140. 1958.

Land management practices for deer and pulpwood can be compatible. To preserve deer shelter in n. Maine, softwood cuttings should be selective and should not reduce crown closure of spruce-fir stands to less than 50% or of spruce-fir-hardwood stands to less than 75%. Group selection in irregular patches and strip clearcutting are the best methods for they maintain more uniform food and shelter conditions over the years and hence a more stable deer population. Shelterwood cutting, the scattered tree system, and clearcutting are unfavorable because of the long cycle, only a small part of which is favorable for deer, so that strong fluctuations in deer numbers are produced. Hardwoods are important for food rather than shelter, so problems are somewhat different. Cutting cycles of 10-15 years maintain reasonably stable browse conditions. Group selection cutting and strip cutting are recommended. Winter cutting will produce more sprout growth than summer cutting.--L. F. Stickel.

Graham, Samuel A. (U. Mich., Ann Arbor.) RESULTS OF DEER EXCLOSURE EXPERIMENTS IN THE OTTAWA NATIONAL FOREST. Trans. 23d N. Am. Wildl. Conf.: 478-490. 1958.

15 exclosures were placed where there had been selective logging, 5 in each of 3 forest types. Results are reported in tables and discussed in detail. Study of numerous milacre plots inside and outside exclosures after 8 years indicated that some tree species were much reduced by deer browsing and others were little affected. Hard maple and red maple survived although severely browsed. Birches, cherries, basswood, hemlock, white cedar and aspens were much commoner inside. Spruce and balsam fir were eaten but little (unless deer populations very dense) and tended to replace palatable young trees. Overbrowsing in the mixed northern hardwood-hemlock type will be disastrous for deer and forest, for pure maple stands will not support deer and will be prone to disease attacks. This study shows, among other things, that the same density of deer may cause undesirable changes of forest composition in one area, but may produce desirable changes in another. The important consideration is not deer density, but severity of browsing on desired species. Thus deer management is a very local problem. It may require sharp herd reduction in one place and herd increase in another.

Grisez, Ted J. (NE. For. Exp. Sta., Upper Darby, Pa.) A LOW-COST DEER FENCE. J. For. 57(1): 42-43, 2 photos. Jan. 1959.

A 4.7-acre clearcut strip was enclosed with an 8-ft. fence at cost of $18.15 per chain (66 ft.) in 1956. The great saving was in using living trees for posts insofar as possible. Two widths of 4-ft. galvanized steel fencing, with 6-in. stay-wire spacing, were used. Details of installation are described. Costs go down rapidly as acreage rises: a 250-block could be fenced for $14.52 per acre, which would not be unreasonable to insure stand reproduction. The fence described was stapled to sawmill edging strips, which were nailed to trees, so fence could be moved to new location without much trouble.

Gruell, George. (Nev. Game Comm.) RESULTS FROM FOUR YEARS OF TRAPPING AND TAGGING DEER IN NORTHEASTERN NEVADA. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 179-183. 1958.

Deer in Elko Co. were trapped, tagged, and belled. Clover trap was important in success. Belling was vital for good return data. Contrary to findings elsewhere, deer did not simply make short vertical migrations from season to season. Instead they moved as much as 100 mi. or more, across mountains and drainages. Once arrived, they settled down in small areas. All evidence points to their returning to original areas. Author also reports winter-to-summer weight gains for 6 individual mule deer of various ages and sexes.

Haugen, Arnold O. (Iowa State Coll., Ames.) BREEDING RECORDS OF CAPTIVE WHITE-TAILED DEER IN ALABAMA. J. Mamm. 40(1): 108-113. Feb. 1959.

Data on rutting season activity, gestation, and fawning of Odocoileus virginianus were secured during a 6-year study of captives. Seventeen productive matings by 5 does were observed. Does permitted copulation only on the 1 day they were in heat. Copulation was evidenced by a final lunge that usually knocked the doe to her knees or entirely off her front feet. Peak of breeding season occurred in late Jan., with half the fawns being dropped between August 3

and 8. Av. gestation period for 12 pregnancies was 193.8 days. Av. weights of fawns was 5.6 lbs. for ♀♀ and 6.2 lbs. for ♂♂. Measurements are listed for tail length, hind foot, total length, and shoulder height of fawns. Fawns from Ala. were slightly smaller than those described from Michigan.--Author.

Hayes, Frank A., Wm. E. Greer, and Emmett B. Shotts. (U. of Ga., Athens.) A PROGRESS REPORT FROM THE SOUTHEASTERN COOPERATIVE DEER DISEASE STUDY. Trans. 23d N. Am. Wildl. Conf.: 133-136. 1958.

The research team is centered at the U. of Ga. and is financed by 11 se. states. It has good laboratory facilities and can send out 3 field-diagnostic units at the same time, if need be. Needs have been unusually light, however, since operations began in 1957, with none of the major die-offs that caused creation of the system. Teams have investigated an example of overpopulation and arsenic poisoning, starvation owing to high water in Everglades, and 2 cases of laminitis. Otherwise, personnel have kept ready by doing diagnostic work on domestic animals and by taking on the following basic studies of deer: bibliography of diseases, survey of intestinal parasites in SE., anatomical and histological study, survey of incidence of leptospirosis and brucellosis in wild deer, improvement of preservation of blood samples in field, normal haematology and blood chemistry.

Hundley, Louis R. (Va. Mil. Inst., Lexington.) AVAILABLE NUTRIENTS IN SELECTED DEER-BROWSE SPECIES GROWING ON DIFFERENT SOILS. J. Wildl. Mgt. 23(1): 81-90. Jan. 1959.

In addition to the comparison of results of proximate analyses run from Sept. 1954 through Oct. 1955 on 5 browse species growing on 4 study areas near Blacksburg, Va., minor elements determinations for 1 month are reported. Present knowledge is insufficient to allow the use of proximate analyses as a basis for rating different plant species with regard to which provides the most nutritious browse for deer. Such analyses may, however, when accompanied by data regarding deer condition, be helpful in evaluating range conditions.--Author.

Jenkins, David H., and Ilo H. Bartlett. (Mich. Dept. Cons.) MICHIGAN WHITETAILS. Mich. Dept. Cons. 1-80 p., illus. 1959. "For free distribution only."

"Michigan Whitetails" is an admirable attempt to interpret to the hunter some well known facts about deer management. Its theme is that the deer herd is a product of its range rather than of protection from hunters. The history of deer populations in Mich. is traced from 1850 to the present, along with the development of the philosophy that adequate harvest is an integral tool of deer management. Even biologists will be impressed by the amount of research that supports this popular document, for it reports findings from 6 PR projects. For example, more than 50,000 deer have been examined by Game Division biologists during hunting seasons from 1952 to 1957. Full advantage is taken of Warbach's skill as a wildlife illustrator--a hunter can get the major points of the booklet just by following the amusing sketches. Numerous graphs and maps help get the facts across. This booklet takes its place in a growing series of Mich. interpretative bulletins that we believe every wildlife biologist will find interesting and profitable.--Fred H. Dale.

Kline, Paul D. (711 A Ave., Vinton, Iowa.) ADDITIONAL MULE DEER RECORDS FOR IOWA. J. Mamm. 40(1): 148-9. Feb. 1959.

Three recent records suggest that mule deer are widely scattered in Iowa.

Little, Silas, G. R. Moorhead, and H. A. Somes. (US For. Serv., New Lisbon, N. J.) FORESTRY AND DEER IN THE PINE REGION OF NEW JERSEY. US For. Serv., NE. For. Exp. Sta. (Upper Darby, Pa.), Sta. Pap. no. 109. ii + 33 p., 4 figs. 1958.

More than half of this bulletin is a detailed discussion of seasonal foods and food preferences of deer in the pine region of s. N. J. Effects of deer on forest reproduction are brought out clearly. During dormant season, deer in uplands feed primarily on pines, secondarily on other trees, and little on other plants. But at this season, most available food is in lowlands, and there deer feed heavily on Atlantic white-cedar (Chamaecyparis thyoides), which unfortunately is of prime value to both deer and foresters. In growing season,

nonwoody plants make up much of the diet, and most of them are from lowlands. Acorns are important foods for 1-2 months in fall. Forestry practices do much for deer. They provide mosaic of stands of different ages, favor growth of white-cedar, encourage new low growth in uplands. But deer are already numerous enough in some areas to curtail forest reproduction. And they are overbrowsing palatable species, thus reducing carrying capacity for the future, for less palatable species take over. Large deer populations on poor range will mean more extensive damage to farm crops in region. Consideration of economic value of forests, crops, and deer demonstrates that it is sensible to keep herd in balance with its natural food supply, increasing the supply through forestry practices as feasible. "These practices are not charged to game management, and the increased food supplies and ease of hunting would be subsidiary benefits from forestry activities."

McCormack, Roger. (Idaho Dept. Game.) DEER TAGGING IN RELATION TO HARVEST MANAGEMENT ON THE BOISE MANAGEMENT UNIT. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 231-234. 1958.

Keeping a deer herd at carrying capacity is courting disaster. The herd is then at the brink of overpopulation, range damage, and lowered herd productivity. Just one poor year for hunting or one poor year for browse production will start real trouble. It is far better to keep herds slightly below carrying capacity. The necessary decisions can be made from knowledge of percent utilization of preferred foods such as bitterbrush, combined with knowledge of actual kill. Other useful information, however, can be obtained from tagging, and for this purpose a program was started near Boise. The popular Clover trap was improved in several ways, as described here, and other methods are mentioned. Early results are discussed briefly. One thing indicated is that when migration occurs during the open season, the tag returns reflect size of kill more accurately than when migration is not occurring. Probably migrant deer are more accessible to hunters. Another tentative conclusion, in line with findings of others, is that young deer are more vulnerable to hunting than older deer.

McDowell, Robert D. (U. Conn., Storrs.) EMBRYO COUNTS AS A MEASURE OF WHITE-TAILED DEER PRODUCTIVITY. Presented at NE. Section of Wildl. Soc., Oglebay Park, W. Va., April 20-22, 1959. 5 p., mimeo.

Based on 1896 embryos carried by 1144 does from ne. states. Productivity rates by age classes were: 1-year, 1.10; 2-years, 1.62; 3-years, 1.82; 4-years, 1.84; 5-years, 1.91; 6-years, 1.86; 7-years, 1.75; 8-years, 1.58; 9-years, 1.73; 10-years, 1.50; 11-years, 1.36. The 1-year class (precocious fawn breeders) provided almost as many embryos as did the 5-year class and more than any older class. Dams from several good ranges equalled regional peak productivity (1.91 embryos/dam at 5 years) by their third year. The writer believes that the apparent decline in productivity was not caused by advanced ages of dams. Rather, the prevalence of older animals was a characteristic of poor ranges. Dams from poor ranges comprised only 3.0% of the 1-year class, but increased steadily until they comprised 63.0% of the 11-year class. Statistical analyses demonstrated that there was a larger proportion of older dams from poorer ranges. Author suggests that dams should be aged according to year classes, for groupings of classes may mask differences in age composition of breeding ♀♀ and cause error in estimating fawn crops.--Author.

McDowell, Robert D. (U. Conn., Storrs.) RELATIONSHIP OF MATERNAL AGE TO PRENATAL SEX RATIOS IN WHITE-TAILED DEER. Presented at NE. Section of Wildl. Soc., Oglebay Park, W. Va., April 20-22, 1959. 6 p., mimeo.

Based on 1594 embryos carried by 973 does from ne. states. Expressed in ♂♂ per 100 ♀♀, sex ratios of embryos carried by various age classes were: 1-year, 153.3; 2-years, 115.9; 3-years, 107.2; 4-years, 99.2; 5-years, 98.9; 6-years, 95.0; 7-years, 103.4; 8-years, 108.3; 9-years, 41.2; 10-years, 71.4; 11-years, 200.0. Fetal sex ratio for whole sample was 109.2 ♂♂ per 100 ♀♀. There was a significant difference in % of ♂ embryos carried by the 1-year class (precocious fawn breeders) compared with the combined sample of the other 10 age classes. There was a significant correlation between fetal sex ratio and age of dam. Author speculates on possible causes of this correlation. He discusses first births, litter size, and maternal nutrition. It appears that does should be aged by year classes; groupings of classes may mask differences in age composition of breeding ♀♀, which may well account for differences in secondary sex ratios.--Author.

Olsen, O. Wilford, and Jesse E. Williams. (Colo. State U., Fort Collins.) CYSTICERCI OF TAENIA KRABBEI IN MULE DEER IN COLORADO. J. Wildl. Mgt. 23(1): 119-122, 3 photos. Jan. 1959.

Cysticeri of Taenia krabbei were found in muscles of 8% of 716 adult mule deer examined superficially in cold-locker plants, and in all of 5 deer shot on the range and examined minutely. Proglottids from a dog fed cysticerci from a deer produced an infection when fed to a domestic lamb sheep but not in a mule deer fawn. Presence of cysticerci in muscles renders meat unesthetic for human consumption and thereby reduces the kill, often in areas where the kill is important in range management.--O. W. Olsen.

Osebold, J. W., J. F. Christensen, Wm. M. Longhurst, and M. N. Rosen. (U. Calif., Davis.) LATENT ANAPLASMA MARGINALE INFECTION IN WILD DEER DEMONSTRATED BY CALF INOCULATION. Cornell Vet. 49(1): 97-115, 3 figs. Jan. 1959.

Calif. experiments described here seem to demonstrate conclusively "that deer may constitute an important reservoir of infection for anaplasmosis, a fact which can be expected to complicate efforts toward control of the disease in areas where deer and cattle occupy the same range lands."

Quay, W. B. (U. Calif., Berkeley.) MICROSCOPIC STRUCTURE AND VARIATION IN THE CUTANEOUS GLANDS OF THE DEER, ODOCOILEUS VIRGINIANUS. J. Mamm. 40(1): 114-128, 9 illus. Feb. 1959.

Skin samples from 15 N. Y. deer of both sexes and various ages were studied. The tarsal gland is notable for its greatly enlarged arrector pili muscles and the associated enlarged, pale hairs, which may function in visual communication by erection. Glandular elements (sebaceous and apocrine) while somewhat enlarged are smaller than those of certain other species and show little if any sexual dimorphism.

The metatarsal "gland" consists of two histologically different and perhaps functionally different areas: a central glandless area supporting a thick, keratinized, papillated, epidermal patch overlying sensory endings and arteriovenous anastomoses; and a peripheral glandular area (sebaceous and apocrine). The central area may be associated with control of blood flow and temperature regulation, and the peripheral area with leaving scent where the animal lies down.

Interdigital glands primarily contain greatly enlarged sebaceous glands and unusually large arrector muscles. The scarcity of interdigital apocrine glands in our specimens may be a species characteristic. The 3 specialized areas appear to be active in animals of all ages and little if any sexual difference is apparent. No significant correlations were found with the antlered condition in 3 antlered does. Degenerative changes occur first in the apocrine gland units and are most marked in the oldest (21.5 years) doe.—Author.

Robinette, W. L., R. B. Ferguson, and J. S. Gashwiler. (US F&WS, Denver 2, Colo.) PROBLEMS INVOLVED IN THE USE OF DEER PELLET GROUP COUNTS. Trans. 23d N. Am. Wildl. Conf.: 411-425, 2 graphs. 1958.

The authors have applied pellet-group counts on winter deer ranges of Nev. and Utah over a 10-year period. Studies show that increased sampling is necessary with decreased size of area sampled, with decreased density of pellet groups, and with increased variability in pellet-group distribution. Circular plots were more efficient sampling units than strip plots. Authors found 100-square-foot circular plots best for their conditions, because of bias in location of smaller plots and sampling inefficiency of larger plots. Optimum spacing of 100-square-foot plots was 4 to 12 chains apart along transects 20 chains apart where transects were run in direction of greatest variability in pellet-group density. Many fewer pellet counts are required for herd trends than for census purposes. A method for determining herd days spent on winter range and other suggestions for making pellet-group counts are outlined.--W. L. Robinette.

Robinette, W. Leslie, and Dale A. Jones. (US F&WS, Denver 2, Colo.) ANTLER ANOMALIES OF MULE DEER. J. Mamm. 40(1): 96-108, 5 photos. Feb. 1959.

Describes 6 bucks that lacked 1 or both antlers. These plus 8 previously described, similarly afflicted bucks all came from the Oak Creek area in central Utah. The defects were probably genetic, for testes recovered from 2 mature antlerless bucks were normal in size, and sperm was found in the 1 set examined microscopically.

Authors believe association exists between old body injury and antler deformity among ♂ cervids. Of 618 bucks lacking conspicuous old body injuries, only 13 (2.1%) had conspicuous antler deformities. An incidence of 71% was found among 24 ♂ cervids afflicted with old conspicuous body injuries. In 21 ♂ cervids that had both an old injury and antler deformity, deformity was restricted to a single antler in 18. In 16 of the 18, location of both body injury and anomalous antler was determined. In each, the 2 were on opposite sides. In the 3 bucks that had both antlers deformed, body injury was confined to the forelimbs.

Permanent antler and velvet retention by bucks is believed to be caused by deficient production of androgens. Five deer are cited in which atrophied testes were apparently the cause of the deficiency.

Six does possessing pedicels or antlers are described. All 6 does had produced young.--W. L. Robinette.

Ryel, Lawrence Atwell. EFFECTS OF FOREST AGE AND GROWTH ON THE AVAILABILITY OF FORAGE FOR DEER IN WHITE CEDAR SWAMPS. M.S. thesis, Mich. State U. 1953.

Studies of 4 unbrowsed stands in n. Lower Mich. showed that the peak of browse production was in trees 1 to 1.75 inches in diameter. There was little browse on trees of more than 8" in diameter. Increase in available light increased browse. Age or site quality alone had little influence on browse. Studies of 3 browsed stands suggested that moderate browsing stimulated browse production. Light did not increase browse production as it did in unbrowsed stands. For deer food production, it is recommended that small openings be made throughout closed stands and that open stands be thinned to prevent branches of adjacent trees from overlapping. Trees should be cut when they are between 2" and 4" in diameter.--From auth. summ. supplied by G. A. Petrides.

Smith, Arthur D. (Utah State U., Logan.) ADEQUACY OF SOME IMPORTANT BROWSE SPECIES IN OVERWINTERING OF MULE DEER. J. Range Mgt. 12(1): 8-13, 2 figs. Jan. 1959.

During 3 winters, captive mule deer were fed prescribed diets of common Utah browse species. Sagebrush, juniper, and oak are the most important, but not the most preferred species. These 3 species were fed singly, in combination, and in diets that included all preferred browse species. Consumption was lowest in group fed sagebrush alone. Juniper was eaten in greater amounts. When fed together, the mean level of consumption of these 2 species was equal to the sum of the amounts consumed when fed singly. Oak was eaten in quantity whether fed alone or with sagebrush or juniper. It was not eaten well in comparison with the preferred species making up the varied diets. Some animals on varied diets ate more sagebrush or juniper than they did oak. None of the diets appeared to be adequate in digestible nutrients when compared to diets recommended for domestic sheep. It may be improper, however, to expect to attain such a level of nutrition with wild game animals. Neither chemical content nor digestible nutrients is an adequate measure of a plant's value as forage. Only when the reaction of an animal toward the plant is compared to reactions to other forages can the plant's importance be assessed. Plants may have high value in a mixed diet, but may be inadequate as the sole source of forage.--From auth. summ.

MAMMALS--MARINE

Abegglen, Carl E., and Alton Y. Roppel. (US F&WS, Seattle 15, Wash.) FERTILITY IN THE NORTHERN FUR SEAL, 1956-57. J. Wildl. Mgt. 23(1): 75-81, 2 graphs. Jan. 1959.

Examinations were made on 13,255 ♀ fur seals in 1956-7 to determine reproductive condition. Earliest breeding age is 3, as shown by pregnancy in 4-year-olds. Percentage of pregnant seals increased with age from 11% at age 4 to 78% at age 7, then decreased. Comparison of the 1956-7 findings with earlier ones indicated the necessity for comprehensive sampling by age to insure unbiased data.--C. E. Abegglen.

Buckley, John L., compiler. (US F&WS, Wash., D. C.) THE PACIFIC WALRUS / A REVIEW OF CURRENT KNOWLEDGE AND SUGGESTED MANAGEMENT NEEDS. US F&WS, Spec. Sci. Rep.--Wildl. no. 41. iv + 29 p., 11 figs. Dec. 1958.

Digest and summary of present knowledge of the Pacific walrus. Discussion covers the following topics: description, migrations and habitat, food habits, age determination and growth, reproduction, mortality, population status, value, hunting methods and equipment, waste. Highlights of importance to management are summarized and needed knowledge is outlined. "Excessive killing has reduced the Pacific walrus population from an estimated 200,000 to approximately 45,000 in the last 100 years. The decline is continuing. Present hunting methods result in the loss of half of the walruses killed; and only half of those retrieved are fully used." As the population occurs in international waters as well as in territorial waters of the U.S.S.R. and U. S., international cooperation is necessary to census the population and regulate the harvest. As presently helpful measures, the following are recommended: prohibit sale of raw ivory, which would discourage hunting; encourage sale of suitable hides, which would increase the value received for individuals killed; encourage trophy hunting, which would increase the value of individuals killed and also reduce the number killed by reducing the time spent on other walrus hunting by the Eskimos acting as guides; give complete protection in the Walrus Islands in Bristol Bay, which is the only hauling ground used regularly in Alaska.--L. F. Stickel.

Budker, Paul. WHALES AND WHALING. Macmillan Co., 60 5th Ave., N. Y. 11, N. Y. 182 p., illus. 1959. $4.50. [From review in Outdoor News Bul. 13(3).]

The author has drawn upon the mass of information gathered by the Internatl. Whaling Comm., of which he is a member, and from his own wide experience. Budker founded and directs a Whaling Research Center which he operates in connection with his duties as sub-director of the Natl. Mus. Nat. Hist. and Lab. of Colonial Fisheries in Paris. This fascinating book dispels many notions that have won common acceptance about whales, their longevity, length, weight, reproduction, feeding habits, movements, and distribution. The author discusses hunting methods, from the harpoon to methods that are still undergoing development. Rules and regulations, effects of new legislation on preserving whales, rates of pay, and shipping techniques also are covered. This book is sure to be of value to all persons anxious to learn more about whales and whaling.

Mansfield, A. W. (Falkland Is. Depend. Sci. Bur., Cambridge, Eng.) THE BREEDING BEHAVIOUR AND REPRODUCTIVE CYCLE OF THE WEDDELL SEAL (LEPTONYCHOTES WEDDELLI LESSON). Falkland Islands Dependencies Survey Sci. Reps. 18: 1-41, maps, 6 pl. 1958. [From Biol. Abst. 33(3).]

See good author's summary in Biol. Abst. 33(3).

Olsen, O. Wilford. (Colo. State U., Ft. Collins.) HOOKWORMS, UNCINARIA LUCASI STILES, 1901, IN FUR SEALS, CALLORHINUS URSINUS (LINN.), ON THE PRIBILOF ISLANDS. Trans. 23d N. Am. Wildl. Conf.: 152-175, 4 figs. 1958.

This worm is the only helminth in fur seals and it occurs only in pups. Sea lions have this worm, but seem to be unimportant vectors. Blue foxes have a different species of the genus. Experimental infections of seals were hard to establish. Larvae in great numbers survive over winter in sandy beaches, infect new pups, reach sexual maturity in 3 weeks. Eggs hatch in fall. Symptoms and pathology in seals are described. Hookworms may account for some of the increased pup mortality of recent years, but other factors also appear to be at work, for of 553 dead pups, 1/3 had no worms and another 1/3 had light infestations. Treatment of beaches with various nematicides and other agents had little effect on worms, except for cresylic disinfectant. A large area was treated with this, but pup mortality was not reduced--evidence that techniques were at fault or that worms were not main cause of deaths.

Scott, D. M., and H. D. Fisher. (Biol. Sta., St. Andrews, N. B.) INCIDENCE OF THE ASCARID PORROCAECUM DECIPIENS IN THE STOMACHS OF THREE SPECIES OF SEALS ALONG THE SOUTHERN CANADIAN ATLANTIC MAINLAND. J. Fish. Res. Bd. Canada 15(4): 495-516, map. 1958. [From Biol. Abst. 33(3).]

See abst. in Biol. Abst. 33(3).

MAMMALS--MARINE--Continued

Slijper, E. J. DAS VERHALTEN DER WALE (CETACEA). Handbuch der Zoologie (Berlin), Bd. 8, Teil 10, No. 14 (Lief. 15): 1-32, illus. May 1958. [From J. Mamm. 40(1).]

Tanaka, S. (Tokai Reg. Fish. Res. Lab., Japan.) ESTIMATION OF WHALE POPULATION ON THE BASIS OF TAGGING EXPERIMENTS. Bul. Japanese Soc. Sci. Fish. 22 (6): 330-337. 1956. [From Biol. Abst. 33(4).]

In Japanese with English summ. Marking of fin whales was carried out on 1 of the 3 n. Pacific major whaling grounds, n. of the Aleutians and e. of the 180° meridian, in 1954 and 1955. Tagging experiments and biological surveys indicate that populations are relatively discrete and remain on the grounds all months of the year. However, returns of tagged whales indicate that some of them wander away and the author says the estimates of the population are not reliable. He says the fin whale population in the region studied is between 5 and 50,000.--G. Gunter.

BIRDS--GENERAL

Mason, Edwin A. (Arcadia Aud. Sanctuary, Easthampton, Mass.) MASSACHUSETTS AUDUBON LIST OF SHRUBS AND TREES FOR ATTRACTING BIRDS. [Cover title: A selected catalogue of trees and shrubs for beauty and wildlife.] Published as section without page numbers in Mass. Aud. 43(3), Jan.-Feb. 1959, and as pamphlet of 8 unnumbered text pages. 25¢ from Mass. Aud. Soc., 155 Newbury St., Boston 15, Mass.

Lists 38 varieties of trees and shrubs that are especially useful in Mass., tabulates their chief qualities, and states price. All are available from nurseries or through Mass. Aud. Soc. Sale of the stock is source of income to the Society and allied groups.

U.S.S.R. STUDIES OF THE OKA-RIVER ORNITHOLOGICAL STATION, vol. I. Works of the Oka-River Govt. Reserve, vol. 2. Moscow. 1958. [From review by W. Rydzewski, The Ring 17.]

"In the present volume there are 29 papers by various authors on ringing (report on 1937-56 activities), trapping (7 papers), phenology, faunistics, ecology, nutrition, etc., of birds...of the reserve. The reserve itself is situated on Oka River in central Russia and its director is W. Teplov. This new publication is welcome... It is a great pity, however, that no, even short, summaries in any other language have been added to the individual papers..."

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Dawson, Wm. R. (U. Mich., Ann Arbor.) RELATION OF OXYGEN CONSUMPTION AND EVAPORATIVE WATER LOSS TO TEMPERATURE IN THE CARDINAL. Physiol. Zool. 31(1): 37-48. 1958. [From Biol. Abst. 33(1).]

See abst. in Biol. Abst. 33(1).

Fisher, Harvey I. (S. Ill. U., Carbondale.) THE "HATCHING MUSCLE" IN THE CHICK. Auk 75(4): 391-399, 2 figs., 1 pl. Oct. 1958.

Study of a fugitive but well-developed muscle that apparently serves to power the egg tooth in pipping of birds' eggs.

Harper, W. G. (Meteorological Office, East Hill, Houghton Regis, Bedfordshire, Eng.) DETECTION OF BIRD MIGRATION BY CENTIMETRIC RADAR--A CAUSE OF RADAR 'ANGELS'. Proc. Roy. Soc., Ser. B, Biol. Sci. 149(937): 484-502, 14 text figs., 2 pl. of 10 figs. Dec. 1958.

"High-power centimetric radar at times records random scatterings and occasionally dense displays of small blobs of echo, which have been called radar 'angels'. As output powers have increased, these displays have come to present an inconvenience, at times approaching a hazard, on airfield-control radars. They have been widely believed to be of meteorological origin, by reflexion or refraction of energy from atmospheric discontinuities, but no meteorological theory so far proposed has managed to explain all their observed properties. It is shown that these properties can be satisfactorily explained on the assumption that the echoes are received from birds on migration. The directions

of movement recorded over several years at East Hill are in good agreement with known migration movements in southeast England, mainly eastward and northeastward in spring, southward and westward in autumn, and the seasonal distribution and flight speeds are shown to fit this explanation. Visual confirmation has also been obtained. With a telescope mounted on the aerial of a target-tracking radar, small flocks of birds have been seen when the radar was tracking angel echoes, and it was clear that the radar was following their flight. It would seem unnecessary to invoke any further mechanism to explain radar angels, and, because movements of birds are substantially world-wide, it would follow that there is little prospect of removing their effects from airfield-control radars. It is clear that radar can provide information of great value to the ornithologist. The records presented in this paper demonstrate the essentially broad-front nature of inland migration movements and the great heights at which these movements sometimes take place. They provide evidence that nocturnal migration can be much heavier than daytime migration. Finally, analysis of the winds associated with these movements suggests that migration rarely takes place with seriously adverse winds, and that weather movements of wintering birds in particular may be largely down-wind movements."--Auth. abst.

Howell, Thomas R. (U. Calif., Los Angeles.) A FIELD STUDY OF TEMPERATURE REGULATION IN YOUNG LEAST TERNS AND COMMON NIGHTHAWKS. Wilson Bul. 71(1): 19-32, 3 figs. Mar. 1959.

Hudson, George E., Patricia J. Lanzillotti, and Glenn D. Edwards. (State Coll. Wash., Pullman.) MUSCLES OF THE PELVIC LIMB IN GALLIFORM BIRDS. Am. Midl. Nat. 61(1): 1-67, 20 figs. Jan. 1959.

Humphrey, Philip S., and Kenneth C. Parkes. (Peabody Mus., Yale U., New Haven 11, Conn.) AN APPROACH TO THE STUDY OF MOLTS AND PLUMAGES. Auk 76(1): 1-31, 10 figs. Jan. 1959.

"A re-evaluation of the currently accepted terminology of plumages and molts is presented. The significance of the complete 'postnuptial' molt as a landmark of plumage equivalence is supported, but the importance of the plumage gained at this molt should be stressed rather than that of the 'plumage' lost. The plumage attained at the complete molt may be considered homologous in most birds; other plumages have evolved as additions in response to various types of selection. A practical terminology is suggested for the description of molts and plumages and for indicating homologies between different groups of birds with respect to patterns of feather replacement. The new terminology is needed to replace older ones which were semantically dependent on other phenomena. Existing patterns of feather replacement are enumerated, in order of increasing complexity, from a hypothetical ancestral condition. Application of the terminology and its use in graphic representation are illustrated, using previously published data on Calypte anna, Cyanocitta stelleri, and Lanius ludovicianus." --Auth. summ.

Kramer, G., J. C. Pratt, and Ursula von St. Paul. NEUE UNTERSUCHUNGEN ÜBER DEN "RICHTUNGSEFFEKT". J. Ornith. 99: 178-191. 1958. [From notice by H. C. M., Auk 76(1).]

"A further investigation into the directional differences in homing performance of pigeons. The 'directional effect' persisted at distances of 8 to 200 km and also under overcast skies. The results are taken to indicate that the observed differences are not due to differential ability to orient as to compass direction but that the ability of determining the location of home (locating on a 'map') is different for the various directions from the home loft."

Lawrence, Mrs. Louise de Kiriline. (Rutherglen, Ont.) ON REGIONAL MOVEMENTS AND BODY WEIGHT OF BLACK-CAPPED CHICKADEES IN WINTER. Auk 75(4): 415-443, 10 figs. Oct. 1958.

Detailed study based on many marked individuals. Provides data on local movements and population shifts. Analyzes changes in amount of fat and discusses factors responsible for these changes.

Mauersberger, G. ATTEMPTS TO ESTABLISH THE PIED FLYCATCHER (MUSCICAPA HYPOLEUCA), CARRIED OUT IN THE SOVIET UNION.----A COLLECTIVE REVIEW. J. Ornith. 98(4): 445-448. 1957. [From Biol. Abst. 33(1).]

In German. This review is based upon papers published in Russian and is primarily on the work of Poliwanow, Schtscherbakow, Trues and Uspenskij who transported eggs, nestlings, and adult flycatchers with varying success into areas not inhabited by this bird. In 1953, out of 51 adult males and 97 adult females moved from Oka-Terrassen into Central-Tschernozjom (400 km), none were in the "new" area the following year while 2% and 23.7% had returned home. Also, during 1953-54, 308 adults were transported with nest material to Askania Nova (1000 km) and 26 of these remained in the new region. Out of 408 nestlings transplanted 50 km during 1953-54, 30 returned home, 1 was found 3 months later in s. Spain (4000 km), 1 was found a month after release in Verona (2500 km), and the rest were not recovered. In 1953, 963 young were moved into Central-Tschernozjom and the following year 25 nests were noted to have good clutches in the new area.--D. E. Davis.

Morris, Desmond. (U. Oxford, Eng.) THE COMPARATIVE ETHOLOGY OF GRASS-FINCHES (ERYTHRURAE) AND MANNIKINS (AMADINAE). Proc. Zool. Soc. London 131 (3): 389-439, 5 pl. Nov. 1958.

Long paper in which results of study of behavior are used to suggest numerous changes in classification of a difficult group of birds.

Preston, F. W. (Box 149, Butler, Pa.) VARIATION OF EGG SIZE WITH AGE OF PARENT. Auk 75(4): 476-477. Oct. 1958.

Available evidence suggests that egg size increases and finally decreases as parent birds mature and then age. In studying egg sizes, the most useful and least variable measurement is breadth.

Sauer, E. G. F. CELESTIAL NAVIGATION BY BIRDS. Sci. Am. 199: 42-47. 1958. [From Auk 76(1).]

"A clear popular summary of Sauer's experiments with various Old World warblers, which are interpreted as showing that these nocturnal migrants orient by means of constellation patterns."

Tedd, J. G., and D. Lack. (Lack: Ed. Grey Inst. Field Ornith., Oxford, Eng.) THE DETECTION OF BIRD MIGRATION BY HIGH-POWER RADAR. Proc. Roy. Soc., Ser. B, Biol. Sci. 149(937): 503-510, 10 figs. Dec. 1958.

"The new and more powerful R.A.F. 10 cm radar sets frequently detect 'angels' to ranges exceeding 60 miles from the station. The seasons and times of day of their occurrence, their speed in relation to the wind, their directions of movement, and the influence of the weather, all fit the view that such echoes come from migrating birds, especially passerine birds. At a Norfolk station, the heaviest activity occurred eastwards in March and April, with a peak around 22.00 h G.M.T., and west-south-west in October and November, with peaks around 22.00 h and 10.00 h G.M.T."--Auth. abst.

Udvardy, Miklos D. F. (Zool. Inst., Uppsala, Sweden.) CONTRIBUTIONS TO THE KNOWLEDGE OF THE BODY TEMPERATURE OF BIRDS. Zool. Bidrag Uppsala 30: 25-42. 1953. [From Biol. Abst. 33(4).]

Mean, maximum and minimum temperatures were determined by thermocouple for 67 species, for proventriculus and rectum. Proventricular temperatures are considered more reliable. No significant differences were recorded for waders and passerines. The suggestion that body weight should be in inverse proportion to body temperature was not confirmed by these studies.--From auth. summ.

Vleugel, V. A., and W. von Westernhagen. FORMEN DES ZUGEN IN ABWEICHENDER RICHTUNG UNTER DEN EINFLUSS GEOGRAPHISCHEN FAKTOREN. Dansk Ornith. Foren. Tids. 51(4): 176-190. 1958. [From Auk 75(4).]

"Deflected migration under the influence of geographical factors. A general review of directional lines and reverse migration." In German with Danish summary.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Behle, Wm. H. (U. Utah, Salt Lake City.) THE BIRDS OF THE RAFT RIVER MOUNTAINS, NORTHWESTERN UTAH. U. Utah Biol. Ser. 11(6). 40 p. 1958. [From review by Frank McKinney, Auk 75(4).]

"The third paper of a series dealing with the avifauna of western Utah. Introductory sections describe the region and its ecologic formations, and comparisons are made with avifaunas of adjacent areas. 172 kinds (species and subspecies) of birds are known from the region. The systematic list gives information on status and habitat and in many cases subspecific relationships are considered in detail."

Behle, Wm. H., John B. Bushman, and Clifton M. Greenhalgh. (U. Utah, Salt Lake City.) BIRDS OF THE KANAB AREA AND ADJACENT HIGH PLATEAUS OF SOUTHERN UTAH. U. Utah Biol. Ser. 11(7): 1-92, 8 photos. Oct. 1958. No price stated.

Consists mainly of a well-annotated list of species. About 11 pages of the introductory sections describe area, its plant belts, ecological formations, and avifaunal relationships. Species accounts emphasize specimen records and localities, but include any ecological or natural history observations that were made, and they summarize the status of each species in the region.

Bull, J. L. THE BIRDS OF THE NEW YORK CITY AREA. Am. Mus. Nat. Hist., N. Y. 24, N. Y. 47 p. 1958. 85¢. [From notice by K. C. P., Auk 75(1).]

"A briefly annotated list of all species collected or observed in New York City, and adjacent portions of southern New York, northern New Jersey, and southwestern Connecticut. Distribution given only in general terms, with indication of preferred habitat of most breeding species. Terms used for relative abundance and frequency of occurrence are carefully defined. The area covered is shown on a double-page map. Subspecific identifications given for some species, but not for all."

Gabrielson, Ira N., and Frederick C. Lincoln. THE BIRDS OF ALASKA. Stackpole Co., Harrisburg, Pa., and Wildl. Mgt. Inst., Wash. 5, D. C. xiii + 922 p., 10 pl., 2 figs. 1959. $15.00.

This thick volume, the result of 14 years of research and writing, is based on an enormous volume of published information, much field work, and data from Fish & Wildlife Service files. As would be expected, the book is a great mine of information. Species accounts occupy most of the pages (53-826). They give native names, indicate size of bird, describe plumages, tell a little about nest and eggs, outline general range, give detailed information on status and distribution in Alaska, review winter range, report available data on spring and fall migration, and discuss "Haunts and Habits." The longest section of a species account is that on status and distribution in Alaska, for here numerous individual records are collected in relatively readable form. The section "Haunts and Habits" includes general natural history and miscellaneous information, all presented informally. Taxonomy is discussed for some species. The book begins with a 28-p. chapter on the history of ornithology in Alaska. The second chapter, 7 p., discusses some interesting aspects of Alaskan ornithology, such as what species are resident, migrant, or casual, and which are exceptionally plastic in local variation. Third chapter is a 4-p. discussion of migration. Fourth chapter is a 9-p. consideration of life zones and faunal districts. Game birds that were introduced are listed; all probably failed. In the back of the book are a gazetteer by Myra A. Putnam, an exhaustive bibliography of 55 p., a hypothetical list, a list of recently added species, and an index to species. The 10 color plates were contributed by O. J. Murie and E. R. Kalmbach. Most of them show several species in a habitat group. They are not impressively reproduced in the copy at hand.

Grube, George E. (State Teach. Coll., Lock Haven, Pa.) THE BREEDING BIRDS OF ADAMS COUNTY, PENNSYLVANIA. Lock Haven Bul. (State Teach. Coll., Lock Haven, Pa.), Ser. I. no. 1: 45-57. 1959. [Reprint p. 1-15.]

Brief description of area is followed by an informative, annotated list that gives data on status and habitat of species, and includes occasional natural history observations. "The orchard belt is an ornithological desert! The practice of spraying probably prevents nesting birds from thriving there. Many of the orchards are sprayed 20 or more times each season and one or two sprayings in the spring involve a deadly gas which kills all animal life. The few birds that breed in the orchards are late nesting species or species producing a second brood."

Johansen, Hans. REVISION UND ENTSTEHUNG DER ARKTISCHEN VOGELFAUNA. Pt. 1. EINFUHRUNG UND REVISION DER GAVIAE-GALLI. Acta Arctica 8: 1-98, illus. 1956. 30 Danish kr. Pt. 2. REVISION DER GRUES-PASSERES UND ENTSTEHUNG DER ARKTISCHEN VOGELFAUNA. Acta Arctica 9: 1-131, illus. 1958. 35 Danish kr. from Soc. Arctica Scand., Zool. Mus., Copenhagen. [From review by Eugene Eisenmann, Auk 76(1).]

In German with extensive English summary. Treats all birds that breed north of the polar tree-line "from the viewpoint of distribution, geographical origin, and phylogenetic relationship. For each species (or species group) considered truly Arctic a circumpolar map is provided, indicating the distribution of the various forms. The author's familiarity with the considerable Russian literature on Arctic birds, listed in the bibliography, makes this work of special value. As a foundation to the systematic treatment, there is an elaborate preliminary discussion of the many drastic climatic and ecological fluctuations in the Arctic during Pleistocene and Recent times. Johansen points out that tundra-inhabiting species had their ranges restricted and broken up not only during the periods of glaciation, when much of the Arctic was covered with ice, but also during the height of the interglacial periods, when forest covered most of the present tundra and coastal areas were reduced by the rise in sea-level. The Recent 'Atlantic Warm Period' (between 7,000-3,000 years ago), when the climate was warmer than today, also affected Arctic bird distribution. Speciation in the Arctic is considered to be largely the consequence of isolation in tundra refugia, both north and south of the glaciated areas, during the Pleistocene. In such refugia isolated populations developed differences, which, in many cases, resulted in a failure to interbreed freely when changed conditions enabled the allied populations to expand their ranges... Students will doubtless disagree with some of the phylogenetic speculations, but this does not detract from the usefulness of the distributional data and maps in this fine work."

Mengel, Robert Morrow. A STUDY OF THE DISTRIBUTION OF THE BREEDING BIRDS OF KENTUCKY. Ph.D. thesis, U. Mich. 343 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

Bird distribution is analyzed from the viewpoint of environmental disturbance, forest type, and physiography. Life zone, biome, and biotic province systems of classification are considered and each is found to have usefulness in Ky. The most acceptable system seemed to be a modification of the biotic provinces system. On this basis, 5 avifaunal regions are described and discussed in detail. Distribution of breeding birds is summarized and tabulated, and recent changes in the avifauna are discussed.

Rapp, W. F., Jr., J. L. C. Rapp, H. E. Baumgarten, and R. A. Moser. REVISED CHECK-LIST OF NEBRASKA BIRDS. Occ. Pap. Neb. Ornith. Union no. 5. viii + 35 p. + index. 1958. $1.00 from Neb. Ornith. Union, 430 Ivy Ave., Crete, Neb. [From notice by Eugene Eisenmann, Auk 76(1).]

"This is a briefly annotated list giving local distribution and status in a summarized fashion, mentioning also the subspecies that have been recorded..."

Remmert, H. AVES. DIE TIERWELT DER NORD- UND OSTSEE. Lieferung 38, Teil 12j. Akad. Verlagsgesellschaft Geest & Portig, Leipzig. 102 p. 1957. DM 11.00, paper. [From review by W. Rydzewski, The Ring 17.]

"...the author limited himself to species and problems relating to marine biology, ecology, and distribution. This manner of presentation is welcome giving the reader information of defined scope within which species are treated with great care. One third of the book is occupied by the general characteristics and descriptions of the area (North Sea and Baltic) as well as its ornithological features. The book fulfils well its purpose, giving the reader a comprehensive and well ordered review of ornithological problems in the area covered."

Salt, W. Ray, and A. L. Wilk. THE BIRDS OF ALBERTA. Queen's Printer, Edmonton. 511 p., illus. 1958. $5.00 prepaid. [From long review by C. S. Houston, Blue Jay 17(1).]

A popular book in which all 315 species are illustrated, most of them in color. It has a page of text and a half-page illustration for each species. The low price of such an elaborate volume was made possible by subsidy. The book's main purpose is to assist in identification. Sections of each species

account treat description, field identification, nest and eggs, and remarks. Small outline maps show ranges of species. There is a page on bird banding, 2 illustrated pages on bird structure, and a map of vegetation zones. Representative nesting dates are reported for 187 species and documented breeding records for 10 species. "Much unpublished information has been utilized, including field notes of forty Alberta ornithologists." The book does not have a bibliography, however, and gives little information on such matters as migration dates and banding records.

Street, Phillips B. (Rt. 1, Chester Springs, Pa.) BIRDS OF THE POCONO MOUNTAINS, PENNSYLVANIA. Cassinia 41: 3-76. 1954 (Dec. 1955).
The annotated list that comprises the body of this paper is preceded by a brief description of the area and a 4-p. history of ornithological studies in the area. The annotated list is devoted chiefly to records that pertain to status of species, but there are also notes on reproduction and some other aspects of avian natural history. Bibliography of 3.3 pages.

BIRDS--POPULATIONS & FLUCTUATIONS

Cox, G. W. (Vivarium Bldg., Wright & Healey Sts., Champaign, Ill.) A COMPARISON OF WINTERING BIRD POPULATIONS IN THREE OPEN FIELD TYPES IN CENTRAL OHIO. Ohio J. Sci. 58: 189-193. 1958. [From Auk 76(1).]
"Disked corn stubble, undisturbed corn stubble, and soybean stubble were censused."

Frith, H. J. FOOD HABITS OF THE TOPKNOT PIGEON. Emu 57(5): 341-345. 1957. [From Biol. Abst. 33(1).]
In recent years there has been an increasing body of circumstantial evidence that the numbers of animal species are largely controlled by their food supply (e.g. Lack, 1954). In a rich subtropical habitat one might suppose that food for birds is usually abundant; however, it has been shown, in this paper, that the failure of the crop of one fruit was sufficient to force a nomadic species on to another fruit which formed the food of another. The result was a probable catastrophe to both species. This is considered further circumstantial evidence of the importance of food as a regulating factor in animal numbers.--Auth. discussion.

Merikallio, F. FINNISH BIRDS. THEIR DISTRIBUTION AND NUMBERS. Fauna Fennica 5: 1-181. 1958. Publ. by Soc. pro Fauna et Flora Fennica, Helsinki. [From notice by Eugene Eisenmann, Auk 76(1).]
"A detailed distributional list. The estimated number of breeding pairs is given for each species, with 131 distributional maps showing relative abundance in different parts of the country. The quantitative data, based largely on line surveys made throughout the country from 1941-1956, are surely unrivalled for an area as large as Finland. 327 species are listed; the total number of breeding pairs is estimated to be 32,160,000."

Van Riper, Walker. (Denver Mus. Nat. Hist., Colo.) ESTIMATING A HUMMINGBIRD POPULATION. Auk 76(1): 100-101. Jan. 1959.
By amount of syrup taken from feeder. Some results are discussed.

Walcott, Charles F. EFFECTS OF CITY GROWTH ON BIRD LIFE. Mass. Aud. 43(3): 120-122. Jan.-Feb. 1959.
"In summary, it may be stated that the effects of city growth on the bird life in Cambridge [Mass.] over the past ninety-five years have been unfortunate, resulting in a reduction in the number of species and in the number of nesting pairs of each species. Not only this, but the quality of the bird life from an aesthetic point of view is much less attractive than formerly. Some of the deleterious factors have been the introduction of the house sparrow, and starling, the spraying of shade trees, and the destruction of habitat by increasing congestion of buildings. Another phenomenon of urbanization has been the appearance of predatory species such as the screech owl and sparrow hawk. The crow and blue jay have been outstanding in their adaptation to city life while the downy woodpecker and chickadee are both present in smaller numbers. Both

the wood thrush and house wren nested regularly for over a decade coincident with a general increase of these species throughout the East, but both have since disappeared from the area. Nevertheless, the number of pairs of birds per acre in this area still compares favorably with the number found in more rural surroundings in New England today."

BIRDS--ECONOMICS, CONTROL, MORTALITY

Bassini, Ettore. INCHIESTA PRELIMINARE SULLA UCCELLAGIONE. Richerche di Zoologia applicata alla Caccia (U. Bologna, Italy) 29: 1-125, 10 figs. 1958. In Italian with English summary. A study of the vast bird-catching industry of Italy. It tells about and illustrates the various elaborate installations used to trap birds, reports on the numbers and distribution of these traps throughout the country, discusses opinions of hunters and farmers about bird catching, and considers trends in numbers of trapping installations. Opinions about bird catching are varied and contrasting, but the installations are a little commoner almost everywhere in Italy than they were in 1931.

Brewer, Richard, and Jack A. Ellis. (U. of Ill., Champaign.) AN ANALYSIS OF MIGRATING BIRDS KILLED AT A TELEVISION TOWER IN EAST-CENTRAL ILLINOIS, SEPTEMBER 1955-MAY 1957. Auk 75(4): 400-414, 1 fig. Oct. 1958.
Data are given for kills on 7 dates. Mortality was 10 times greater in fall than spring. Kills occurred when there were 80-100% cloud cover, ceiling of 400-1600 ft., and poor visibility. Usually a cold front had passed within 12 hours. Wood warblers were the birds most numerous in the kills. Most dead birds were adults. Females predominated in fall samples. Males predominated in 1 May sample, and in the other the ratio was about 1:1. Most birds killed were moderately to very fat. Data for kills at the tower in question are compared with data for many other mass mortalities reported from e. U. S. "Index values to total volume of migration based on numbers of birds killed at television towers are subject to several sources of error. The values may be useful as minimum estimates, if there is no aggregation of birds in migration or attraction of them to the tower. In the absence of conclusive evidence that these conditions do not exist, figures so obtained should be used with caution."

Cochran, Wm. W., and Richard R. Graber. (WCIA, Champaign, Ill.) ATTRACTION OF NOCTURNAL MIGRANTS BY LIGHTS ON A TELEVISION TOWER. Wilson Bul. 70(4): 378-380. Dec. 1958.
"Our observations indicate that confusion of nocturnal migrants by tower lights occurs only on nights when the ceiling is low, and migrants are apparently forced to fly near or below the 1000- to 3000-foot level. On clear nights or on nights when cloud cover is high, we learned, through the use of special audio equipment...that numbers of high-flying migrants pass the vicinity of the tower without becoming confused. Thus, calculations of total numbers of migrants based on the sample of birds killed at television towers are erroneous on at least two counts: (1) migrants are attracted to the towers by the tower lights, and (2) only a very small per cent of the birds which reach the tower are killed."

Drinnan, R. E. (Fish. Res. Bd. Canada.) THE WINTER FEEDING OF THE OYSTER-CATCHER (HAEMATOPUS OSTRALEGUS) ON THE EDIBLE MUSSEL (MYTILUS EDULIS) IN THE CONWAY ESTUARY, NORTH WALES. Ministry of Agr., Fisheries & Food, Fishery Invest., ser. 2, vol. 22, no. 4. ii + 15 p., 6 figs. 1958. 4s. from H. M. Stationery Office, London.

Fisher, James. THE MENACE OF OIL POLLUTION. Atlantic Nat. 12(4): 166-169. 1957. [From Biol. Abst. 33(1).]
Oil pollution from oil-burning ships and recently established European oil refineries, kills thousands of sea birds: 100,000 off British coast, winter 1951-52; 30,000 from a single oil pollution case in Sweden, 1952; the auk colony at Elsa Craig, Scotland, has decreased from tens of thousands to a few hundreds. This observed mortality is a small fraction of the total. Oil destroys the bird's heat-insulating mechanism. Legislation begun in the 1920's prohibiting oil discharge within a 50-mile offshore area, was introduced at the League of Nations in 1934. In 1954 an inter-governmental conference, attended by owners of 95% world's shipping tonnage and 23 delegates, banned the deliberate discharge of oil, but ratification is still awaited by 15 countries.--E. M. Boyd.

Gibb, J. A. (Animal Ecol. Sect., D.S.I.R., Wellington, N. Z.) PREDATION BY TITS AND SQUIRRELS ON THE EUCOSMID ERNARMONIA CONICOLANA (HEYL.). J. Animal Ecol. 27(2): 375-396, 6 figs. + 1 pl. Nov. 1958.

The larvae overwinter and pupate in cones of scots pines (Pinus sylvestris) and less often of Corsican pines (P. nigra). Blue tits (Parus caeruleus) and coal tits (P. ater) eat about 45% of the larvae each winter. Tits efficiently exploited places and situations where they could find larvae most readily: their predation was intensity- or density-dependent. Density of the tit population did not affect the proportion of the larvae that was eaten; instead it affected the length of time the stock lasted. Squirrels ate cones for the seeds, so their destruction of larvae was incidental and density-independent. Destruction of pine seed by larvae or squirrels is economically unimportant in the area (State Forest of Thetford Chase, East Anglia).--L. F. Stickel.

McIntyre, J. D. PREDATION ON LEACH'S PETREL ON EASTERN CANADIAN BIRD ISLANDS. Ont. Field Biol. 11: 4-6. 1957. [From notice by Frank McKinney, Auk 75(4).]

"Unless the number of foxes is reduced, the future of the Leach's Petrel colony on Bonaventure Island may well be imperilled."

Outram, D. N. (Biol. Sta., Nanaimo, B. C.) THE MAGNITUDE OF HERRING SPAWN LOSSES DUE TO BIRD PREDATION ON THE WEST COAST OF VANCOUVER ISLAND. Fish. Res. Bd. Can., Pacific Prog. Reps. 111: 9-13. 1958. [From Biol. Abst. 33(4).]

Clupea pallasi in B. C. spawn principally on vegetation such as eel grass in the intertidal zone where eggs are eaten by glaucous-winged gulls and herring gulls. Losses of spawn were studied by taking, at 3-day intervals during incubation, 8 25- or 16-square-inch samples from 25-square-foot plots protected from birds, and from unprotected control plots. Losses to birds were calculated from the difference. Egg consumption by birds on the av. increased egg loss by 39%. It was variable, and was most marked in 1st 3 days after spawning. Stomach analyses showed glaucous-winged gulls to contain more herring eggs and less accompanying vegetation than herring gulls.--J. L. Hart.

Riabinin, Sergiusz. OBSERVATIONS ON BIRDS INHABITING TREES IN FIELDS AND IN FORESTS AT WANDZIN. Ekologia Polska - Seria A 5(10): 311-355 + inserted folded table. 1957 (1958).

In Polish with English summary. An ecological study of 62 species of birds that are typical of those areas in Poland where forests and woods are intersected by fields, where soils are dry and sandy, and where there are no ponds or other water areas. Birds were classified according to preferences in nesting and feeding habits. A concurrent analysis was made of insect pests. Conclusion: the number of insectivorous birds is insufficient to make a real contribution to destruction of the pests or the lessening of harmful activities of certain insects. Recommendations are made [specific procedures not listed in summary] for changes in composition of tree groups in fields to encourage species such as starlings, tits, jackdaws, and jays that are capable of being of fundamental value in insect control.--L. F. Stickel.

Ridley, M. W., and Richard Percy. THE EXPLOITATION OF SEA BIRDS IN SEYCHELLES. Colonial Research Studies no. 25. viii + 78 p., illus. 1958. 12s. 6d., paper, from H. M. Stationery Office, London. [From review by W. Rydzewski, The Ring 17.] Copy in US Dept. Int. Library.

"This study has been made...to investigate the present status of sea bird breeding colonies in the Seychelles with particular regard to Sterna fuscata and the annual crop of eggs that may be taken without damaging the population. The book contains the following chapters: History of the Egg Industry, Natural History of Sooty and Noddy Terns, Islands with Tern Colonies, Experiments on Desnoufs Island, The Ecology of Breeding Colonies, Bird Protection in Seychelles, Recommendations."

Tottenham, Katharine. THE OIL MENACE. Aud. Mag. 61(1): 3 photos. Jan.-Feb. 1959.

Best statement we have yet seen on just how to treat oiled birds with fuller's earth. First the bird is warmed by placing wad of cotton under each wing and wrapping whole bird in cotton and then placing in temperature of about 70°F. When bird is warm, it can be force-fed with a little food that contains capsule

of fish-oil concentrate. Bird should be dry in a few hours and then can be unwrapped. It must not be allowed to preen oiled feathers, for the oil may be toxic. Next day removal of oil can begin. Fuller's earth, used as a dry shampoo, is rubbed into feathers thoroughly, with special attention to clotted quills in flight and tail feathers. Rinsing is done in lukewarm water and bird is redried in cotton batting. Such cleanings can be repeated a 2-day intervals until all but harmless stains are gone. Some of the birds, including gannets, swans, and razor-billed auk, are very dangerous to handle; suggestions for safe handling are offered.

BIRDS--PARASITES AND DISEASES

Anon. WILD BIRDS AS DISEASE DISSEMINATORS. J. Am. Vet. Med. Assn. 134(3): 117. Feb. 1, 1959.

"In an extensive study by the Ministry of Agriculture, Fisheries, and Food, in England, feral birds were proved to be carriers of many diseases: Among the bacterial diseases were anthrax, botulism, coligranuloma, listeriosis, pullorum disease, fowl typhoid, and Salmonella thompson infection. Virus diseases carried were infectious avian encephalomyelitis, infectious laryngotracheitis, aftosa, fowl paralysis complex, Newcastle disease, ornithosis, and vesicular dermatitis of seabirds. Among the carriers of ornithosis were the gulls, petrels, terns, ducks, pheasants, pigeons, doves, magpies, finches, and sparrows.--I. F. Keymer in Vet. Rec. (Sept. 13, 1958): 736." Complete.

Beadle, Leslie D. (US Pub. Health Serv., Atlanta, Ga.) STATUS OF MOSQUITO-BORNE ENCEPHALITIS IN THE UNITED STATES. Pub. Health Rep. 74(1): 84-90, 1 fig. Jan. 1959.

This brief review paper demonstrates that encephalitis (eastern, western, and St. Louis) is a disease of wild birds and mosquitoes, with human beings and horses only incidental hosts. One of the factors that favors an outbreak is high mosquito population. Another is high rate of infection in adult and nestling birds. The only known approach to prevention is control of mosquitoes in areas where encephalitis may be endemic or epidemic.

Bleitz, Don. (Bleitz Wildlife Found., Los Angeles 38, Calif.) TREATMENT OF FOOT POX AT A FEEDING AND TRAPPING STATION. Auk 75(4): 474-475. Oct. 1958.

Foot pox (= avian lymphomatosis = fowl pox) of small birds was treated successfully by injection of solution of streptomycin sulphate in proportion of 0.008 g. per cc., with a dosage of 1 minim per day per ounce of body weight, for a 5-day period. This made the dosage per ounce of body weight 0.0005 g. Injections were made in thigh.

Furmaga, Stefan. (Zadlad Parazytologii W.S.R., Lublin Akad. 11, Poland.) THE HELMINTH FAUNA OF PREDATORY BIRDS (ACCIPITRES ET STRIGES) OF THE ENVIRONMENT OF LUBLIN. Acta Parasitol. Polonica 5(13/21): 215-297, illus. 1957. [From Biol. Abst. 33(3).]

In Polish with English summ. See abst. in Biol. Abst. 33(3).

Sieburth, John McNeill. (V.P.I., Blacksburg, Va.) RESPIRATORY FLORA AND DISEASES OF ANTARCTIC BIRDS. Avian Diseases 2(4): 402-408. Nov. 1958.

Presents results of serological tests for salmonellosis and ornithosis and observations on the respiratory flora.

GAME BIRDS--GENERAL

Gullion, Gordon W. (Cloquet For. Exp. Sta., Cloquet, Minn.) SOME PROBLEMS NEVADA FACES IN DETERMINING SMALL GAME POPULATION TRENDS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 209-212. 1958.

Discusses many of the factors that complicate getting adequate data on trends in game birds. Among these factors are concentration and dispersal of birds as weather alters range conditions, irregularity with which birds come to watering places, cyclic changes of populations, uncertainty as to what percentage of cocks are at breeding grounds at any one time, differential usage of different

parts of state by migratory doves depending on weather, changes in usage of guzzlers with weather, and impracticability of using enough manpower to get statistically reliable trend data for the various species. "Gallizioli...has shown that to demonstrate a 25 percent change in Gambel's quail numbers in Arizona from statistically reliable trend data, it would be necessary to run from 19 to 35 transects in each vegetative or habitat type." Thus "the manpower problem involved in obtaining statistically sound data becomes considerable, if not prohibitive." The Gallizioli reference mentioned is: Ariz. Game & Fish Dept., Completion Rep., Proj. W-78-R, 13 p., 1957.

QUAIL

Flickinger, Don Damian. (Vanderbilt U. Sch. Med., Nashville, Tenn.) ADRENAL RESPONSES OF CALIFORNIA QUAIL SUBJECTED TO VARIOUS PHYSIOLOGIC STIMULI. Proc. Soc. Exp. Biol. & Med. 100(1): 23-25. Jan. 1959.

Adrenal responses of pen-raised and wild California valley quail subjected to caging, cold, cortisol, and ACTH treatments have been studied and compared. Groups of pen-raised and wild birds showed no consistent nor significant differences in either adrenal weight or histometry. Spleen weights were highly variable. No histologic evidence of thyroid activation was seen in birds subjected to cold. Experimental treatments, potentially capable of causing marked adrenal responses in common laboratory mammals, were relatively ineffectual in eliciting adrenal response in the quail. It is suggested that the adrenal, and possibly the thyroid, may be comparatively non-reactive in quail as compared with laboratory mammals.--Auth. summ.

Gallizioli, Steve, and Wendell Swank. (Ariz. Game Dept., Phoenix.) THE EFFECTS OF HUNTING ON GAMBEL QUAIL POPULATIONS. Trans. 23d N. Am. Wildl. Conf.: 305-319, 4 graphs. 1958.

A 7-year study demonstrated that: "1. Quail numbers on an unhunted control area fluctuated about the same as those of a hunted area. When a sharp drop in quail population levels occurred it was equally severe on hunted and unhunted areas. 2. With three week end (16 day) seasons removal by hunting varied from 4 to 24 per cent of the prehunt population (including crippling loss). 3. Removal in any year was directly proportional to quail density; the highest take of 24 per cent occurred in 1953 with quail density at 71 per 100 acres, the low of four per cent came in 1956 when density was but nine per 100 acres. 4. More quail were lost to natural factors between September and the hunting season than were removed by hunting. 5. Hunting pressure and kill decreased rapidly as the season progressed despite the fact that hunter success was generally as high on the last week end as on the first. 6. Although hunter success in any year tends to parallel the ratio of juvenile to adult birds, there is evidence suggesting that quail density is the real determinant of hunter success and that the relation of hunter success to the ratio of young to adult is simply the result of juveniles often being the determining factor in relative quail density."--Auth. summ.

Gullion, Gordon W. (Cloquet For. Exp. Sta., Cloquet, Minn.) THE 'PROXIMITY EFFECT' OF WATER DISTRIBUTION UPON DESERT SMALL GAME POPULATIONS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 187-189. 1958.

Often there is little that can be done for wildlife in the desert except to provide water. Many desert areas do not merit even this improvement. But where water sources are installed, the distance between water sources is of great importance. In Nevada, Gambel quail will travel about 1/2 mi. in a day. In fact, most populations don't travel more than that in a 2-year period. It is desirable, therefore, to locate guzzlers not more than about 1 mile apart. Data are cited to show that where this is done, populations of Gambel quail are much higher than where guzzlers are farther apart.

LeFebvre, Eugene A., and Joyce H. LeFebvre. (Mus. Nat. Hist., U. Minn., Minneapolis.) NOTES ON THE ECOLOGY OF DACTYLORTYX THORACICUS. Wilson Bul. 70 (4): 372-377, 3 figs. Dec. 1958.

Biology of the singing quail in a lumbered area: habitat, numbers, voice, behavior, care of young, feeding habits.

Wallmo, O. C., and P. B. Uzzell. (A. & M. Coll., Coll. Sta., Texas.) ECOLOGICAL AND SOCIAL PROBLEMS IN QUAIL MANAGEMENT IN WEST TEXAS. Trans. 23d N. Am. Wildl. Conf.: 320-327, 4 figs. 1958.

Based on studies of ecology and population dynamics of scaled quail (Callipepla squamata) from 1949 to 1957. Climatic fluctuations have proved to be the principle influence controlling populations. Studies of hunting revealed that human sociological problems are more important to the manager than ecology of the game species. Over most of the range of scaled quail there is a deficiency of hunting pressure, but in restricted areas there is inadequate hunting space. Emphasis is placed on the need for bringing economic and sociological factors up to date with ecological knowledge in game management.--O. C. Wallmo.

Wunz, Jerry. (Ky. Dept. Wildl. Resources.) QUAIL STOCKING--WHAT ARE OTHER STATES FINDING OUT ABOUT SUCH PROJECTS? Ky. Happy Hunting Ground 15(3): 6-7, 30, 2 photos. May 1959.

Ky. has the largest quail hatchery in the world. Should it be kept? Some sportsmen support it, others question it. Author rounds up pertinent findings from 9 states, with emphasis on Ky. research. He summarizes the findings as follows: "1. All are in agreement that survival of pen-reared birds is generally so low that any benefits that might be received from stocking are eclipsed by high costs. 2. In no instance have scientific findings revealed an increase in the quail population resulting from the stocking of pen-reared birds. 3. There is danger of diluting wild quail with 'inferior blooded' birds or infecting them with disease... It is apparent that the findings and experiences of all the states mentioned in this article are unanimous in the opinion that quail stocking is biologically and economically unsound." Immediate abandonment of the hatchery is not recommended: distribution of quail holds sportsmen's clubs together and improves hunter-farmer relations; also, natural drop of quail population is expected soon, and if this coincided with end of stocking the public would draw the wrong conclusion.

PHEASANTS

Anon. THE PHEASANT IN CONNECTICUT / ASSET OR LIABILITY? Conn. Wildl. Cons. Bul. 5(1): 1, 5-7, 1 fig. Jan.-Feb. 1959.

"...the pheasant stocking program generates more dissatisfaction, more friction with landowners and more unacceptable behavior on the part of all too many hunters than the program is worth." Conn. is marginal pheasant territory, so the program has evolved into one of stocking both sexes for the gun during shooting season. On a cost basis alone the program is unfair, for even if all revenue from hunting licenses were devoted to pheasants, it would provide only 1 bird per hunter. Worse, 1 type of shooter began to follow the stocking trucks to bag birds upon release. This sort of behavior caused resentment and more closed areas. Also, great pressures built up for larger numbers of releases in this, that, and the other area. The conclusion is that hunters will have to group together to do more for themselves in producing pheasants, that stocking may have to be done on specially closed days in order to defeat the truck followers, and that pheasant hunting should be put into perspective as a fine form of recreation. If pheasant meat is all that is wanted, let's buy it ready-dressed at the game farm--it's cheaper that way.

Carney, Samuel Morgan. AN ANALYSIS OF VARIATION AMONG PARTICIPANTS IN CROWING-COCK PHEASANT CENSUSES. M.S. thesis, Mich. State U. 1954.--From auth. summ. supplied by G. A. Petrides.

See WR 91 p. 85 for abstract of publication.

Dale, Fred H., and James B. DeWitt. (Patuxent Refuge, Laurel, Md.) CALCIUM, PHOSPHORUS AND PROTEIN LEVELS AS FACTORS IN THE DISTRIBUTION OF THE PHEASANT. Trans. 23d N. Am. Wildl. Conf.: 291-294. 1958.

Summary of work on pheasant nutrition conducted since 1949 at the Patuxent Research Refuge. Pheasant chicks fed experimental diets failed to develop normally on protein levels of 15 and 18%. With 22% protein they grew at a reduced rate as compared to those on 28%. Protein level of the reproductive

diet was shown to be important; low production of eggs and young resulted from levels below 25%. Calcium was found to be even more critical than protein level for reproduction; birds on a winter diet that furnished 145 mg./kg. per day had poor reproductive success the following spring. About 600 mg./kg. of Ca per day was necessary in the reproduction diet. Birds on an intermediate level of Ca (about 0.5% of diet) showed evidence of cumulative deficiency. It was concluded that pheasants receiving levels of Ca no higher than 0.5% in nature might display "straggling failure" such as has been observed in several midwestern areas.--F. H. Dale.

Nelson, Lee Kern. LAND USE IN RELATION TO PHEASANT ABUNDANCE IN EATON AND LENAWEE COUNTIES, MICHIGAN. M.S. thesis, Mich. State U. 1952.

Pheasant populations on an area in Lenawee Co. were estimated to be 2.1 times as large as on an area in Eaton Co. The fundamental reason for the difference was the difference in soil types. In Lenawee Co., soil was flat, semi-wet clay, which permitted sustained high crop production. 26.5% of the acreage was in corn, 45% in hay and small grains. The high corn production was considered the most important factor favoring pheasants. Hay and grain production were of supplemental value. In Eaton Co., land was rolling to hilly, best suited to general farming. 14% of the acreage was in corn, 39% in hay and small grains. A large proportion was in permanent pasture. Cover was not a limiting factor on the Eaton Co. area, for this county contained more idle land than Lenawee Co.--From auth. summ. supplied by G. A. Petrides.

Paludan, Knud. (Vildtbiologisk Sta., Kalø pr. Rønde, Denmark.) SOME RESULTS OF MARKING EXPERIMENTS ON PHEASANTS FROM A DANISH ESTATE (KALØ). Danish Rev. Game Biol. 3(3): 167-181, 1 map. 1958.

In English. Conclusions: "1. The rapid population turnover in conjunction with the large discrepancy between actual and theoretical utilization show that the population increment must be harvested as soon as possible. 2. Release of chicks with foster-mothers gave very poor returns. 3. Since improved results were obtained by brooder-reared chicks this method is recommended. 4. Brooder-reared chicks to be released in a new environment should be at least 11-12 weeks old on release. 5. In view of the rather low percentage utilization of released birds the price per bird harvested will necessarily remain fairly high."

Reynolds, Temple A., Jr. (Utah Dept. Game.) DO LONGER SEASONS AFFECT PHEASANT POPULATIONS? Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 247-250. 1958.

In the Utah and Idaho studies reported here, length of season made practically no difference. Much longer hunting seasons could be permitted, insofar as effect on pheasant population is concerned. For abstract of technical bulletin on this work, see WR 88 p. 67.

Sandfort, Wayne W. (Colo. Dept. Game.) PHEASANT DISTRIBUTION AND DENSITY CLASSIFICATION IN COLORADO. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 239-246. 1958.

Surveys were conducted in Colo. to obtain data on pheasant distribution and densities in 1957. Many sources of information were used. The spring-breeding-population index was used for rating population density. Six density classes were selected and are described. Size of pheasant range, and sizes of areas having different density classes, were calculated for state, regions, and counties. Amount of range associated with irrigated and dry-farmed lands was ascertained. Many findings of the study are reported in tables. Management uses for the results are suggested. An example is given to show how data may be analyzed to show relative abundance and hunting pressure for specific counties.--From auth. summ.

Sandnes, Gunnar C. (Gettysburg Coll., Pa.) FERTILITY AND VIABILITY IN INTERGENERIC PHEASANT HYBRIDS. Evolution 11(4): 426-444. 1957. [From Biol. Abst. 33(3).]

See abst. in Biol. Abst. 33(3).

PHEASANTS--Continued

Terman, C. Richard. RINGNECKED PHEASANT ABUNDANCE AND FOOD AVAILABILITY IN CLINTON AND CASS COUNTIES, MICHIGAN. M.S. thesis, Mich. State U. 1954.
Samples of winter foods available in fields and field borders showed significantly greater amounts in Cass Co. than in Clinton Co. Cass Co. has many fewer pheasants, but the difference apparently is not caused by lack of food.--From auth. summ. supplied by G. A. Petrides.

GROUSE, PARTRIDGE, ETC.

Ammann, G. A. (Mich. Dept. Cons., Lansing 13.) SHARP-TAILED GROUSE PREDATION BY GOSHAWK. J. Wildl. Mgt. 23(1): 110-111. Jan. 1959.

Carlisle, Bob. (Texas Game Comm.) A PROMISE TRIES ITS WINGS. Texas Game & Fish 17(1): 4-5, 3 photos. Jan. 1959.
Story of release of 488 wild-trapped chukars from Nevada on Black Gap Wildlife Management Area in Trans-Pecos Texas.

Christensen, Glen C. (Box 678, Reno, Nev.) THE EFFECTS OF DROUGHT AND HUNTING ON THE CHUKAR PARTRIDGE. Trans. 23d N. Am. Wildl. Conf.: 329-341, 1 map. 1958.
During a 3-year drought in Nev. there was a decided decrease in chukar production and decline in population. With the advent of proper range conditions the populations made a quick recovery. It is indicated that the precipitation pattern and effectiveness has a direct bearing upon the annual food crop and that the condition of the range follows in turn as the determining factor in chukar production. To all indications the holding of a hunting season during a period of population low has no important depressive effect upon the chukar population. Areas in Nev. that held chukar seasons during the drought period recovered as quickly as those that did not have seasons, and these areas are now providing the bulk of the state harvest. It is indicated that even the most heavily hunted regions of the state can bear up well under a 30-day season. Longer seasons and larger bag or possession limits are justified in the outlying regions of the state.--Author.

Crunden, Charles W., editor. (116 Walnut, Elko, Nev.) WESTERN STATES SAGE GROUSE QUESTIONNAIRE. NUMBER V. iii + 37 p., 2 maps, mimeo. 1958.
Not a publication, but an exchange of information between specialists in the various states and provinces that have sage grouse. The report consists of the replies of these specialists to a series of questions. Questions pertain to changes of projects, publications, hunting seasons, population levels, habitat improvement, kills, effect of hunting pressure, use of checking stations, sex and age ratios in kill, validity of strutting ground counts, age determination at various ages, sex determination in young, trapping and marking methods, determination of population trends, characteristics of wintering populations, and estimates of range. Maps show population trends and areas open to hunting in 1958. Tables report hunting seasons and hunting statistics for 1958, and sex and age ratios of bagged birds.

Dorney, Robert S. (Wis. Cons. Dept., Box 191, Ladysmith, Wis.) RELATIONSHIP OF RUFFED GROUSE TO FOREST COVER TYPES IN WISCONSIN. Wis. Cons. Dept., Tech. Bul. no. 18: 1-32, illus. 1959.
Utilization of forest types was studied to provide basis for better integration of timber and grouse production. Tracks and roosts were sampled extensively on study areas. Ruffed grouse were distributed equally in all forest types, but were scarce in open land. Hardwood types mixed with conifers were used more than either alone. The Wis. grouse were less dependent on conifers for shelter than were N. Y. grouse. A heavy shrub understory is needed at drumming sites. Lack of shrubs in young hardwood stands is causing rapid loss of drumming territories. Thus management of n. hardwoods on 60-100 year rotation is detrimental. "Forest management that will maintain or increase ruffed grouse populations includes underplanting aspen with conifers, protection of ironwood because of its value as a winter food source, maintenance of alder for summer brood use, perpetuation of forest openings, and light grazing of offsite aspen by livestock. The group selection cutting of oak to promote young coppice growth which then retains its leaves simulating conifers offers some promise as a management technique in oak types."--From auth. summ.

Hammer, Marie, M. Køie, and R. Spärck. (Spärck: Zool. Mus., Copenhagen, Denmark.) INVESTIGATIONS ON THE FOOD OF PARTRIDGES, PHEASANTS AND BLACK GROUSE IN DENMARK. Danish Rev. Game Biol. 3(3): 183-208. 1958.
In English. Results of analyzing contents of crops of both young and adult birds of species mentioned are tabulated and are discussed at length.

Palmer, Walter L. (Wildl. Exp. Sta., Houghton Lake Heights, Mich.) SEXING LIVE-TRAPPED JUVENILE RUFFED GROUSE. J. Wildl. Mgt. 23(1): 111-112. Jan. 1959.
Development of live-trapping techniques for ruffed grouse in recent years necessitated a technique for accurately sexing juvenile birds as early as mid-August, before post-juvenal plumage is complete. The amount of orange-red pigmentation above the eye is a good indicator: sex-typical ♂♂ possess moderate to large amounts, ♀♀ very little or none. Pigmentation is fairly well developed at 9 weeks of age. Miscellaneous sex characteristics usable on young birds are explained. Results indicate that about 95% of juveniles are correctly sexed at trapping time. A slightly higher error arises among adults.--Author.

Pyrah, Duane. (Wyo. Game & Fish Comm.) WYOMING'S SAGE GROUSE MANAGEMENT PROGRAM. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 184-186. 1958.
Tells what studies are currently being made of sage grouse in Wyo., how they are conducted, and mentions some of the results.

TURKEY

Lewis, John B. (Mo. Cons. Comm., Columbia.) TRENDS IN WILD TURKEY POPULATION IN THE MISSOURI OZARKS. Proc. Soc. Am. For. Meeting 1957: 92-94. 1958.
Turkeys in Mo. declined from some 250,000 a century ago to about 3,600 in 1934. Causes included poaching and habitat decline under timber cutting, overgrazing, and repeated burning. Conditions have improved a little in recent years with national forest establishment, better fire protection, and regrowth of forests. Attempts to restore turkeys are under way in areas that are suitable for turkeys and where local people are cooperative. Game farm turkeys, even the Pa. stock, did not do well. Transplants of wild turkeys thrived, and are being stepped up with aid of cannon net. One large area is being managed for turkeys and will provide planting stock. Dense timber is NOT the best habitat. The best turkey concentration in Mo. occupies area of 49% timber, 21% woods pasture, 18% permanent pasture, and 12% crop fields. In general, the most manageable ratio of timbered to open land for good turkey habitat is about 70% timber and 30% open. Turkeys are now censused by interviews with local people. About 85% of birds are located in this way, and trends can be followed in various large areas. Data are given on some of these trends. In general, the 1957 population was up 30% from that of 1952, and all regions but 1 had improved or remained the same. A short spring gobbler season may overcome apathy of local people.

Russo, John P. (Ariz. Game Dept.) KAIBAB TURKEY TRANSPLANT. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 175-178. 1958.
42 Merriam's turkeys were trapped and released on the Kaibab North range of Ariz. in early 1949. Turkeys probably did not occur there before. The birds bred and spread with great success and are now established on the entire summer range of the Kaibab National Game Preserve and Grand Canyon National Park, north rim. Limited permit hunts were held in 1956 and 1957. Kills were 91 and 59 for hunter success of 79% and 74%. Sex and age data are reported from various surveys. A useful table shows weights of gobblers, hens, and poults when whole, eviscerated, and dressed.

Schorger, A. W. (U. Wis., Madison.) EXTIRPATION OF A FLOCK OF WILD TURKEYS IN ADAMS COUNTY, WISCONSIN. Passenger Pigeon 22(4): 170-171. Winter 1958.
Briefly describes history and fate of a small population that came from releases of game-farm stock. The birds persisted for 20 years, but were too unwary, were too inclined to stay around houses and farms, had poor breeding success, tended to breed over too long a season, crossed with domestic stock, got poultry diseases, and were too vulnerable to poaching.

DOVES AND PIGEONS

Caldwell, Larry Derl. A NESTING STUDY OF THE MOURNING DOVE IN KALAMAZOO COUNTY, MICHIGAN. M.S. thesis, Mich. State U. 1955.

Forty-five adult pairs nested 165 times in one season and fledged 101 young. 85% of the nests were in evergreens. Call counts showed that the number of calling birds was not correlated with the number of active nests. The peak of calling was about 54 days later than the peak of nesting. Sex and age ratios of 75 Sept.-shot doves were about even. Only 3.4% of fledgling production was in Sept. although 41.7% of the 36 adults in the shot sample had pigeon milk in their crops, which supposedly indicates that adults have dependent young. It is recommended that possibilities of dove hunting in Mich. be explored by experimental open seasons in selected areas.--From auth. summ. supplied by G. A. Petrides.

Downing, Robert L. (Okla. State U., Stillwater.) SIGNIFICANCE OF GROUND NESTING BY MOURNING DOVES IN NORTHWESTERN OKLAHOMA. J. Wildl. Mgt. 23(1): 117-118. Jan. 1959.

Studies of ground nesting by mourning doves in nw. Okla. revealed an av. ground-nesting density of 0.025 nest per acre with an av. success of 29%. The av. tree-nesting density in the same region was 1.78 nests per acre with av. success of 49%. Trees, which occupy less than 1/2 of 1% of the total area of the region, produce an estimated 41% of the doves.--Author.

Levine, Norman D., and Sidney Kantor. (U. Ill., Urbana.) CHECK-LIST OF BLOOD PARASITES OF BIRDS OF THE ORDER COLUMBIFORMES. Wildl. Dis. 1: 1-38 p. on 1 Microcard. Jan. 1959.

Reports are tabulated of Trypanosoma, Plasmodium, Haemoproteus, Leucocytozoon, Toxoplasma, hemogregarines, and filariae from birds of the order Columbiformes (doves and pigeons). For each report there is given the host species, parasite species, number of birds examined, percentage of birds infected, and geographic locality. 204 references.--Auth. abst.

Owen, B. L. (US Agr. Res. Serv., Florence, S. C.) RECORDS OF NASAL MITES OF THE MOURNING DOVE. Texas J. Sci. 10(4): 447. Dec. 1958.

Locality and incidence data for Neonyssus zenaidurae from Texas, Ala., and Miss.

Stair, John L. (Ariz. Game Dept.) DOVE MANAGEMENT AND WHAT IT MEANS TO ARIZONA. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 194-196. 1958.

Describes the hunting, the habitat, merits and demerits of call-count survey, and tells a little about banding results. Doves are abundant in Ariz. more by grace of nature than through management. About all man has done is to provide suitable hunting regulations, and to provide water in the desert. As to other management, much is yet to be learned. Present survey techniques demand improvement.

Various authors. SPECIAL DOVE ISSUE. Outdoor Calif. 20(1): 1-20 p., illus. Jan. 1959.

Contains several semipopular articles designed to build up public knowledge of the mourning dove. There is controversy in Calif. as to whether dove hunting should continue. W. D. Bailey and John Cowan tell about habitats, nesting habits, hunting kill, and natural mortality. Donald D. McLean traces the migration routes of west coast doves. W. H. Kiel, Jr., tells how doves are studied on a national basis and how the studies are related to management. Bruce Browning reviews results of food habits studies in Calif. and points out the great difference between eating weed seeds and controlling weeds. Donald D. McLean shows how ages and breeding success are ascertained from wings. John Cowan describes how to make nest bases from shallow cones of wire mesh, and tells how well these cones have worked on a management area in Calif. Merton N. Rosen discourages artificial feeding of doves: apparently many people in San Diego fed doves on a large scale, built up heavy populations, and were rewarded by an outbreak of trichomoniasis. Other examples of heavy dove concentrations being hit by diseases are mentioned. Martin L. Grant's article, "Why hunt mourning doves?" is reprinted from Iowa Conservationist because it covers the subject so well.

Atwater, Melvin G. (Naval Torpedo Sta., Keyport, Wash.) A STUDY OF RENESTING IN CANADA GEESE IN MONTANA. J. Wildl. Mgt. 23(1): 91-97, 2 photos. Jan. 1959.

A study of renesting in Canada geese was conducted on 12 reservoirs in Phillips Co., Montana, in nesting seasons of 1956-7. Twelve nesting ?? were live-trapped at their nests during egg laying or incubation. Eggs were removed from nests to simulate natural nest destruction. Birds were individually marked, released, and observed. Two were known to have renested; 1 renested twice, the other once. These were the only geese trapped and marked during egg laying. Unsuccessful nesters usually moved away from their original nest sites and were generally characterized by considerable restlessness and movement among reservoirs. Data from the 12 marked geese, and the light intensity of "late" nesting, suggested that only a small percentage of Canada geese on the study area renested after their first nests were destroyed.--Author.

Baldwin, Wm. P. (Rt. 1, Box 102-E, Summerville, S. C.) AN INSPECTION OF WATERFOWL HABITATS IN THE MOBILE BAY AREA, ALABAMA. Ala. Dept. Cons., Fed. Aid in Wildl. Restoration, Spec. Rep. no. 2. v + 41 p. + 10 maps. Sept. 1957.

Report of survey made in June 1956. Discusses present waterfowl harvests, supply of waterfowl food, waterfowl values of the various habitats, changes that are underway in environment, possibilities for management in various habitats, suggestions for specific refuges and management areas.

Bezubik, Bernard. THE HELMINTHFAUNA OF WILD DUCKS (SUBFAM. ANATINAE). Acta Parasitol. Polonica 4(9/19): 407-510, illus. 1956. [From Biol. Abst. 33(4).]

In Polish with Russian and English summ. See long author's summary in Biol. Abst. 33(4).

Bossenmaier, Eugene F. (Manitoba Game Branch, Winnipeg.) WATERFOWL SICKNESS DIAGNOSES IN MINNESOTA, NORTH DAKOTA, AND MANITOBA. J. Wildl. Mgt. 23(1): 113-115. Jan. 1959.

Tests that involved the transfer of blood serum from sick wild ducks to mice were performed to determine whether Clostridium botulinum type C toxin or some other agent was responsible for avian sickness in the summer of 1953. Botulism was suspected as the causative factor but toxin-producing species of blue-green algae (Cyanophyta) were present in the die-off areas. Positive diagnoses for botulism were made on 14 of 41 sick ducks collected on 4 separate water bodies. An inherent unknown in the testing method possibly accounts for the failure to confirm botulism in the remaining 27 birds.--Author.

Boyer, George F. (Can. Wildl. Serv., Maple, Ont.) HAND-REARED MALLARD RELEASES IN THE MARITIME PROVINCES. Can. Field-Nat. 73(1): 1-5. Jan.-Mar. 1959.

226 mallards from Delta, Manitoba stock were pen-reared and released at various localities near the border of N. B. and N. S., 1953-5. This paper tells what is known of their distribution and fate. Some mingled and crossed with the more numerous black ducks. Author feels that the mallard stock will be absorbed into the black duck stock.

Chamberlain, J. L. (Randolph-Macon Woman's Coll., Lynchburg, Va.) GULF COAST MARSH VEGETATION AS FOOD OF WINTERING WATERFOWL. J. Wildl. Mgt. 23(1): 97-102. Jan. 1959.

Purpose was to evaluate waterfowl use of marsh plants near Rockefeller Refuge, Cameron Parish, La. Data were based on contents of 1,251 gizzards removed from 17 species of waterfowl in the hunting seasons of 1955-6 and 1956-7. Forty-nine plant species were identified. Seeds of Cladium, Scirpus, and Eleocharis were most frequently taken. Composition of duck populations was different in fresh marsh and brackish marsh areas. There were distinct differences in feeding habits of ducks wintering in the 2 types. These differences imply that food habits are strongly influenced by availability.--Author.

Coulter, Malcolm W. (U. Maine, Orono.) A NEW WATERFOWL NEST TRAP. Bird-Banding 29(4): 236-241, 1 fig. Oct. 1958.

Describes new type of trap that is operated by pull-string. Cylindrical net of 2-in. mesh is attached to a hoop. Hoop is placed around nest and anchored to ground by pegs (or heavily weighted). Net is folded down over hoop. A few rods to guide net are stuck in ground inside net. Pull-string attaches to net, goes up to loop attached to limb or stake, then runs 20-100 yards out to where it will be pulled. Pull on string lifts and closes net.

Elder, Wm. H., and David H. Woodside. (U. Mo., Columbia.) BIOLOGY AND MANAGEMENT OF THE HAWAIIAN GOOSE. Trans. 23d N. Am. Wildl. Conf.: 198-214, 1 map. 1958.

The nene (Branta sandvicensis) is an endangered species found only in the Hawaiian islands. In lava fields high on the east slope of the active volcano, Mauna Loa, a circumscribed breeding ground was discovered. Within 2-1/2 mi. were found 1 active nest, 3 old nests, and 7 adult pairs that raised 12 young to flight stage. Unlike most anatids, the nene breeds on a declining day-length. Study of plumage development in captives permitted back-dating of broods observed in the wild. First egg dates were from Oct. 20 to Dec. 1. Among captives, first dates spanned the winter solstice, extending from Oct. 29 to Feb. 8 (33 clutches). Second clutches were induced in captives by robbing first nests; the renesting interval was 13-43 days. Nene families remained quiet and isolated during the long (10 to 12 weeks) molt and growth period. Flocking and calling began by mid-May and wandering (equivalent to fall migration in N. Am.) lasted 1 month. All birds joined on one traditional summering ground. There a maximum of 35 was seen. Both breeding and summering areas have been made sanctuaries. Artificial propagation during the past 8 years in Hawaii and Eng. has produced 89 young. Although captives now exceed the population in the wild, increase is slow because half of all eggs laid by captives are infertile or fail to hatch.--Wm. H. Elder.

Foster, J. B. SNOW AND BLUE GEESE NESTING IN THE SOUTHERN ARCTIC. Ont. Field Biol. 11: 22. 1957. [From notice by Frank McKinney, Auk 75(4).]

"Reports nesting near Eskimo Point, at Cape Henrietta Maria, and near Churchill."

Goodwin, C. E. BLACK DUCK AND MALLARD POPULATIONS IN THE TORONTO AREA. Ont. Field Biol. 10: 7-18. 1956. [From review by Frank McKinney, Auk 75(4).]

"In 1931, tame mallards and black ducks were released in Toronto and established themselves on a resident semi-wild basis. These birds have hybridized fairly freely, but mallards have increased rapidly in proportion to black ducks. The author reports what is known of this interesting situation, speculates on the factors which might be influencing the population and suggests some of the problems which should be investigated."

Heck, Oscar Benjamin, Jr. STUDIES ON GASTROTAENIA IN WATERFOWL. Ph.D. thesis, State Coll. Wash. 67 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

The tapeworm, Gastrotaenia cygni, from gizzards of ducks and swans, was found to be a form of Diorchus, modified by the different physiologic environment in its abnormal location in the gizzard. Similarly, Nematoparataenia paradoxa is assigned as a species of Ophryocotyle. With their member genera thus removed, the family Nematoparataeniidae and the order Aporidae should be abolished. Histologic conditions in gizzard infections are described.

Herman, Carlton M., and Wm. J. L. Sladen. (Patuxent Refuge, Laurel, Md.) ASPERGILLOSIS IN WATERFOWL. Trans. 23d N. Am. Wildl. Conf.: 187-191. 1958.

Aspergillosis, a respiratory disease most commonly caused by the fungus Aspergillus fumigatus, although frequently the cause of losses in captive birds, has been little studied in wild waterfowl and other wild birds. Evidence indicated aspergillosis to be important in the wild, and studies were conducted on its epizoology. Field collections from corn and other plants have yielded infective spores of Aspergillus. Spores were inoculated into experimental chickens and ducklings and then reisolated from characteristic lesions. A technique was developed for inoculating suspensions of known numbers of spores directly into a posterior thoracic airsac. Less than one million spores of A. fumigatus killed less than 1/2 of experimental chickens; 10 million spores killed over 80% and 50 million killed all inoculated chickens as well as ducklings. Older birds were able to survive as many as 500 million spores except when in weakened condition. Chickens usually started dying within 2 days after inoculation. Those that survived as long as 11 days usually recovered fully in 3 weeks. Pathological involvement usually was confined to lungs and airsacs.--Authors.

Klopfer, Peter H. (Duke U., Durham, N. C.) AN ANALYSIS OF LEARNING IN YOUNG ANATIDAE. Ecology 40(1): 90-102, 9 figs. Jan. 1959.

Experimental and observational studies of ways certain waterfowl learn calls characteristic of their species. Young of surface-nesting species learned calls only when they both saw and heard parent; sound alone was not enough. Wood ducks learned from sound alone, and sight made no difference. The difference between species is correlated with conditions of early life. Young of surface-nesters must learn very soon to recognize and follow the parent by both sight and sound, whereas this is not so important for the hole-nesting wood duck. The domesticated, quackless muscovy was not able to learn to recognize sounds. When small ducks are in a group, they behave almost uniformly, because all will follow the reactions of the first ones, apparently mechanically. When they are tested individually, their behavior varies more widely.--L. F. Stickel.

Kozlik, Frank M. (Calif. Dept. Game.) CALIFORNIA'S PUBLIC WATERFOWL HUNTING AREAS. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 200-206. 1958.

Describes the state, federal, and leased lands that are used in the program; tells how hunting is managed on the areas; tabulates and discusses hunting results on the areas. The program is successful and hunters sometimes have top-notch shooting. The system has been expanded greatly since 1948 and can now accomodate 71,670 hunter-days. It cannot take care of all waterfowl hunting by any means, but it does give hunting opportunities to many men who belong to none of the shooting clubs.

Kuroda, Nagamichi. (Fukuyoshi-cho, Minato-ku, Tokyo.) A LIST OF FIGURES OF HYBRID DUCK TRIBES OF THE WORLD. Annot. Zool. Japon. 31(3): 176-183, illus. 1958. [From Biol. Abst. 33(3).]

Fifty-three hybrid names are listed with the references to the drawings published, and with brief notes on 2 wild hybrids between Branta canadensis subsp. and Anser sp. and between Anas poecilorhyncha zonorhyncha and A. platyrhynchos var. domestica (?).--Y. Watanabe.

Marshall, Wm. H. (U. Minn., St. Paul 1.) WATERFOWL BROOD STUDIES, LAKE ITASCA, MINN. Flicker 30(4): 122-126. Dec. 1958.

Summary of data obtained 1954-58 by members of Inst. for High School Teachers of Biol. under direction of the author, and based on a compilation by one of them, John Lurain. Species were, in order of abundance: mallard, wood duck, hooded merganser, blue-wing teal, and ring-neck duck. Tables show number of broods of each species that were sighted each year, av. brood sizes, av. number of young, and number of brood sightings in relation to shoreline cover. Broods per mile av. 9 along spruce-balsam shoreline and 10 along marsh (sedge) shoreline. Sightings were much less numerous along other types. Records are cited for several brood movements of a mile or more. Comparisons are made with relative numbers of birds of different species in adjacent areas. Results were similar on other lakes throughout the park. In marshy potholes, in contrast, there were more ring-necks.--L. F. Stickel.

Meanley, Brooke, and Anna Gilkeson Meanley. (Patuxent Refuge, Laurel, Md.) OBSERVATIONS ON THE FULVOUS TREE DUCK IN LOUISIANA. Wilson Bul. 71(1): 33-45, 7 figs. March 1959.

This duck is a locally common breeder in rice fields of sw. La. Centers of abundance are mentioned. Tree ducks arrive as rice is planted in spring and usually leave after rice is harvested. A few winter in coastal marshes. Nesting period is May-Aug. Two areas of 5 sq. mi. each had 13 and 20 nesting pairs. All observed nests were in rice fields. Clutch size av. about 13. A clutch of 23 eggs probably was a dump nest. Incubation periods of 24-26 days have been reported. Nests usually have canopy and ramp; none of those seen was lined with down. Renesting compensates for some earlier nest losses. Depredations on rice plantings sometimes occur in spring in water-planted rice fields. Favorite foods are seeds of rice-field grasses and sedges. Flocks totalling 3000 are seen occasionally in fall on Lacassine Refuge, but such flocks represent much of the La. population.--From auth. summ.

Middlemiss, Ernest, compiler. (Rondevlei Bird Sanctuary, Pr. Geo. Dr., Retreat, Cape Province, S. Af.) THE SOUTHERN POCHARD NETTA ERYTHROPHTHALMA BRUNNEA. African Wildfowl Enquiry, Report no. 1. The Ostrich, Supplement no. 2. ii + 34 p., 2 graphs. Jan. 1958.

This booklet, doubly welcome as the 1st report of African Wildfowl Enquiry, provides much valuable information on the following subjects: various plumages, weights and measurements, habits, voice, banding records, distribution, populations and fluctuations, movements, breeding habits, foods, molts, and weight fluctuations.

Milonski, Mike. (Mo. Cons. Comm., Jefferson City.) THE SIGNIFICANCE OF FARMLAND FOR WATERFOWL NESTING AND TECHNIQUES FOR REDUCING LOSSES DUE TO AGRICULTURAL PRACTICES. Trans. 23d N. Am. Wildl. Conf.: 215-227, 4 figs. 1958.

Many studies of nesting waterfowl have been conducted on or near marshes, but little is known of the significance of farmlands for nesting. This study was conducted during 2 summers on the Portage Plains of Manitoba. Most work was concentrated on a 15,850-acre area extending ten miles to the s. of the Delta Marsh. During the study, 608 nests of 7 species of ducks were examined. The pintail was by far the most abundant species, providing 363 nests. The preferred first nesting site for pintails was in stubble. Farming operations on Portage Plains destroyed 57% of pintail nests in 1956 and 41% in 1957. Early cultivation took the heaviest toll. Pintails that renested late in hayfields had little chance for survival because haying started shortly after incubation began. Important sites selected by 112 renesting pintails were: 28% in stubble, 27% in hay, 20% on roadsides. After cultivation began, and again later during mowing, there was a recurrence of aerial chases owing to destruction of pintail nests. In the present study, 27% of 48 moved nests were successful. Desertion appears to be critical in moving nests. Of 27 worked-around pintail nests, 63% were successful. While the success of moved nests was not high, the success of worked-around nests was surprising and suggests that here may be another practical technique for increasing pintail production on farmland.--Author.

Paavolainen, Eero-Pekka. THE BIRD FAUNA OF THE OUTER ARCHIPELAGO IN THE EASTERN PART OF THE GULF OF FINLAND. II. DEVELOPMENT AND MOVEMENTS OF THE DUCK BROODS AFTER THE BREEDING SEASON. Ann. Zool. Soc. Zool. Bot. Fennicae "Vanamo" 18(6): 1-31, illus. 1957. [From Biol. Abst. 33(3).]

In German. According to detailed observations made during 4 years in an area consisting of about 500 islands of different size, there are great differences in juvenile mortality of various duck spp. in different regions. In the outermost region, the mortality of the broods of Anas spp., Aythya fuligula, Melanitta fusca and Mergus serrator is >90%, in the more wooded inner island region the figures for the 3 last-named spp. were >65, 85-100 and 40-45%, respectively. Great differences in mortality of young of Somateria mollissima were observed in different parts of the area, probably owing to local conditions, such as population density, presence or absence of areas suitable to young birds, and abundance of gulls. Abrupt climatic changes often cause high mortality of the young in this sp. Broods of S. mollissima may move several kms. towards open sea, and broods of Mergus spp. often move a few kms. from their place of birth, but with no tendency in either direction. In other spp., observations did not reveal any tendency of broods to move towards more sheltered parts of the island region. Proportion of non-breeding birds, behavior of males during breeding season, and onset of migration are described and discussed.--From abst. by Ernst Palmén.

Sage, Bryan L. HYBRID DUCKS IN NEW ZEALAND. Bul. Brit. Ornith. Club 78(6): 108-113. 1958. [From Biol. Abst. 33(2).]

The history of introduction of mallard into N. Z. and its rapid spread are outlined. Relationship of this species with the native N. Z. grey duck (A. superciliosa) and comparative ecology of the 2 species is discussed. It is suggested that there must be considerable competition for food. Where both species inhabit the same area the grey duck generally gives way to the mallard, partly through being numerically overwhelmed. Environmental changes such as swamp reclamation and drainage also help decrease the grey duck population, but have not affected the mallard. The rate at which mallard replaces the grey

duck in some areas is well illustrated by ringing returns from Manawatu, Wellington; in 1947, 60% of ducks trapped were greys, but by 1955-6 this species represented less than 10% of the total. Hybridization between mallard and grey is frequent and has been going on for some time. The proportion of hybrids decreases from s. to n. The plumage characters of the hybrids are discussed.--From auth. abst.

Schlichting, Harold Eugene, Jr. THE ROLE OF WATERFOWL IN THE DISPERSAL OF ALGAE. Ph.D. thesis, Mich. State U. 272 p. 1958. [From abstract in Dissertation Abstracts 19(7).]

"Viable organisms found on the waterfowl were 87 species from the feet, 26 from the feathers, 25 from the bills, 14 from the gullet, and 8 from the faecal material." These data help explain the distribution of aquatic micro-organisms throughout the world.

Smith, Donald A. (Utah Dept. Game.) AN ECONOMIC EVALUATION OF SELECTED TREATMENTS FOR AVIAN BOTULISM IN WATERFOWL ON UTAH MARSHES. Proc. 38th Ann. Conf. W. Assn. State Game & Fish Comms.: 220-225. 1958.

Conclusions: "A total of 2,214 ducks were treated during this study. Evaluation of the results from economic and recovery standpoints suggest that Class I birds [mildly afflicted] be left unmolested in the field. Class II birds [unable to walk] should be field inoculated with two cc. of polyvalent antitoxin and Class III birds [prostrate] should be captured and transported to a hospital site for inoculation. Collection of teal was extremely difficult during this study and numbers of severely afflicted teal were so small conclusions are difficult to form. However, it is recommended that teal be handled as the larger species and inoculation with one cc. of antitoxin be advised. During small outbreaks, when numbers of Class III birds are limited, it would probably be advisable to treat these prostrate birds by field inoculation. Hospital repair and upkeep would be excessive for small numbers of birds."

Stewart, Paul A. CAPTURING WOOD DUCKS FOR BANDING. Ohio State U. (Columbus), Coop. Wildl. Res. Unit, Release 208. 6 p., 1 fig., mimeo. Jan. 1958.

Provides diagram and description of collapsible, portable trap and gives many suggestions for using it in different sites. Methods and safety of banding incubating ?? are also discussed. Author banded 610 wood ducks by these methods in the years 1955-57.

Stewart, Paul A. SOME WOOD DUCK CENSUS METHODS AND THEIR EVALUATION. Ohio State U. (Columbus), Coop. Wildl. Res. Unit, Release 209. 13 p., mimeo. Apr. 1958.

Relative merits of 5 methods are considered. The river float, the method now used most, is not sensitive enough to show anything more than major population changes, at least as now used with 1 trip in April, 1 in May, and 1 in June. If the 3 trips were all made in a short period in late April or early May, each count would be accompanied by a measurement of variation. Brood counts give a very insensitive measurement unless intensive and supplemented by trapping and banding. Counts of ducks in feeding flights seem useful for following isolated populations, but are limited in general application. Counts of ducks in roosting flights appear to be reasonably reliable for following population trends. Counts in June of successful or occupied boxes appear to provide an accurate method that can be used to follow population trends. Checks of boxes should be supplemented by counts of roosting flights in period after nesting to gain better appraisal of production success.--From auth. summ.

Stotts, Vernon D. (Md. Game Dept., Annapolis.) THE TIME OF FORMATION OF PAIRS IN BLACK DUCKS. Trans. 23d N. Am. Wildl. Conf.: 192-197. 1958.

Substantial numbers of black ducks are paired throughout the year in the upper Chesapeake Bay area. Counts of birds were made from early Feb. to early Nov. during normal nesting and banding studies. Doubles that had the appearance of unity within flock structures were classed as pairs. Four-week samples ranging from 176 to 9,099 birds showed that paired birds were at a peak in April and at a low point in Aug. Observations of maturation in immature birds and collections of paired birds in Nov. indicated that early-paired birds were adults. Immature ?? were probably the next class to become paired.--Author.

Vutchetitch, V. N., and A. Ya. Tugarinoff. SEASONAL DISTRIBUTION AND MIGRATION OF DUCKS (SUBFAM. ANATINAE) ON THE BASIS OF BIRD BANDING IN THE USSR. I. THE MALLARD - ANAS PLATYRHYNCHA L. Translation by J. M. MacLennan, Can. Wildl. Serv., 33 p., processed. Originally publ. by Tsentral'noye Byuro Kol'tsevaniya, Moscow, 1937. Single copies of transl. available on request to Can. Wildl. Serv., Ottawa, while supply lasts. [Copy in US Dept. Int. Library.]

WATERFOWL IDENTIFICATION GUIDE. Miss. Flyway Council. 1-48 p., illus. 1958. Available on request from game departments of states and provinces of the Miss. Flyway Council.

Covers of these guides bear the name of the distributing state or province, but the guides are otherwise alike. They are based on and very similar to the guides issued by the Atlantic Flyway Council. As title indicates, they are identification booklets. Illustrations, which take up most of the space, are in black and white and have key points designated as in Peterson guides. The birds treated are not just the Anseriformes, but also loon, grebes, gallinules, coot, rails, snipe, and woodcock.

CRANES, RAILS, SHOREBIRDS

Bard, F. G. (Sask. Mus. Nat. Hist., Regina.) ANNUAL REPORT OF WHOOPING CRANES IN SASKATCHEWAN, 1958. Blue Jay 17(1): 9-11, 3 figs. Mar. 1959.

Blankenship, Lytle H. INVESTIGATIONS OF THE AMERICAN WOODCOCK IN MICHIGAN. Ph.D. thesis, Mich. State U. 1957.

Woodcock arrived in Mich. during late winter. Spring migration was completed by the last of April. Fall migration was nearly complete by Oct. 20. Breeding season in Upper Peninsula was Apr. 25-May 25. Singing-ground counts were made during these periods. Results were variable; statistical analysis showed that a route would have to be run at least 27 times to obtain confidence limits 25% of the observed mean. Sex could be determined reliably from bill length and from total width of outer 3 primaries. Ratio of total width to total length of these same primaries was also useful. Leg color was used tentatively as a criterion of age. Survival and mortality estimates were made from kill figures in conjunction with data on sex and age ratios, nesting success, and brood sizes. Data indicated that woodcock were not over-hunted. Vegetation, food, weather, and soil were major factors influencing distribution, abundance, and activities. Availability of earthworms was a critical factor. Management recommendations include vegetation control on singing grounds and feeding areas, and a change in hunting season dates to correspond more closely to migratory movements.--From auth. summ. supplied by G. A. Petrides.

Glasgow, Leslie L. (La. State U., Baton Rouge.) BECS ON THE BAYOU. La. Cons. 11(1): 2-4, 21, 4 figs. Jan. 1959.

Biology of woodcock, especially in La.: habitats, time of arrival and departure, concentration areas in state, feeding habits, mating display, nesting, band returns, faithfulness to breeding and wintering localities, sex ratio, population decline as shown by censuses in North, loss of habitat, decimating effects of winter storms, possible effects of insecticidal treatments. Although nesting in La. is rare, woodcocks are common in winter and might well be hunted more than they are. Of 8,300 woodcock banded in La., less than 2% have been recovered out of state. Hunters in Mich. and Wis. provided 44% of out-of-state returns, as shown by map. The birds tend to return to the same breeding and wintering spots. Sex ratio in La. is 70 ♂♂ to 100 ♀♀. Censuses in n. states indicate that population is gradually decreasing. Hunting may be a factor, for annual production is low. Loss of habitat by development, North and South, may be important. Severe storms have real effects on population. Treatment of huge acreages with insecticides may kill or reduce reproduction of woodcock that eat earthworms that have concentrated the chemicals. In spite of these factors, we are likely to have some woodcock as long as we still have forests.

Huey, Wm. S. (P. O. Box 4201, Santa Fe, N. M.) WEIGHTS OF SANDHILL CRANES. Auk 76(1): 96-97. Jan. 1959.

Discussion of weights of 8 living cranes from N. M.

Marshall, Wm. H. (U. Minn., St. Paul.) WOODCOCK SINGING GROUNDS AT THE CLOQUET EXPERIMENTAL FOREST, 1947-1956. Trans. 23d N. Am. Wildl. Conf.: 296-304, 3 figs. 1958.

Sixty-nine different woodcock singing grounds were located on a 3,300-acre, intensively managed forest in ne. Minn. over a ten-year period. The 47 that were used 2 or more years appear to be located with reference to loam and alluvial soils. Sixteen of these grounds were used 4 or more years consecutively--8 on abandoned farm lands, 4 on clear-cut upland areas, and 4 in the swamp-conifer type. Annual use of these areas depended on their supporting partially open brushy cover. The year-to-year use or non-use was determined largely by the amount of invasion of open areas by brush or trees. In several cases, territorialism apparently prevented use of suitable adjacent openings.--Author.

Meanley, Brooke, and Anna Gilkeson Meanley. (Patuxent Refuge, Laurel, Md.) GROWTH AND DEVELOPMENT OF THE KING RAIL. Auk 75(4): 381-386, 2 pl. of 5 photos. Oct. 1958.

Data on growth, development, voice, and behavior of young from hatching to flight stage were obtained by rearing 5 young.

OTHER BIRDS

Berger, Daniel D., and Helmut C. Mueller. (510 E. MacArthur Rd., Milwaukee 17, Wis.) THE BAL-CHATRI--A MODERN VERSION OF AN OLD INDIAN HAWK TRAP. The Ring 17: 86-88, 2 figs. Nov. 1958.

Small cage of wire mesh contains mouse or bird. Top of cage is covered with many slip-nooses made of nylon monofilament. Bottom of cage is weighted to about 3/4 wt. of hawk expected. Details of how to make nooses are supplied. Traps can be left in likely spots, but authors prefer to locate hawk and drop trap from car. They have trapped some 500 hawks of 6 species in this way.

Davis, David E. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) THE SEX AND AGE STRUCTURE OF ROOSTING STARLINGS. Ecology 40(1): 136-139, 1 fig. Jan. 1959.

"From 1951-1957 starlings were trapped in winter in a roost. Data on sex and feather characteristics were used to determine that 56.0% of the males and 70.0% of the females were subadults (first year). Also 51.7% of the subadults were males and 66.3% of the adults were males. If we assume a stationary population we can use the proportion of subadults as the probability of dying and follow an imaginary population of 51.7 males and 48.3 females through successive years. The sex composition of this hypothetical population is 66.8% male which is indistinguishable from the observed percentage. This result agrees with the conclusion that the observed difference in sex composition results from an excessive mortality of females."--Auth. summ.

Davis, David E. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) OBSERVATIONS ON TERRITORIAL BEHAVIOR OF LEAST FLYCATCHERS. Wilson Bul. 71(1): 73-85, 1 photo. Mar. 1959.

"This study [of Empidonax minimus] attempts to use information obtained about the breeding sequence to understand certain aspects of the development of territorial behavior. The paper also discusses in some detail the clutch size, hatching and fledging success, and the incubation and feeding behavior for a dozen nests."

Hamilton, Terrell H. (Harvard U., Cambridge, Mass.) ADAPTIVE VARIATION IN THE GENUS VIREO. Wilson Bul. 70(4): 307-346, 7 figs. Dec. 1958.

Long, detailed study of variation in relation to environment. "The objective of this paper is to present the patterns of variation exhibited by those members of this genus having wide distributions in North and Middle America, and to comment on some possible explanations for the adaptive meanings of such patterns."

Kilham, Lawrence. (7815 Aberdeen Rd., Bethesda 14, Md.) TERRITORIAL BEHAVIOR OF WINTERING RED-HEADED WOODPECKERS. Wilson Bul. 70(4): 347-358, 2 figs. Dec. 1958.

OTHER BIRDS--Continued

Mathisen, John, and Ann Mathisen. (Neb. Game Comm., Alliance.) POPULATION DYNAMICS OF DIURNAL BIRDS OF PREY IN THE PANHANDLE OF NEBRASKA. Neb. Bird Rev. 27(1): 2-5, 12-16, 4 graphs. Jan. 1959.

Presents information on seasonal abundance, migration periods, and relative species composition of the Falconiformes of the area. This group of birds was followed through one year. Data were gathered by recording all Falconiformes observed for 1/4 mi. on either side of the road during automobile travel. An index of abundance was calculated for each species by dividing number of miles traveled into number of birds observed. A total of 623 raptores was recorded during 17,807 miles of travel. Population changes for each major species are shown graphically.--J. Mathisen.

McClure, H. Elliott, M. Yoshii, Y. Okada, and W. F. Scherer. (US Army Med. Res. Unit, Inst. Med. Res., Kuala Lumpur, Malaya.) A METHOD FOR DETERMINING AGE OF NESTLING HERONS IN JAPAN. Condor 61(1): 30-37, 3 figs. Jan.-Feb. 1959.

"Tables and figures are presented for quick and easy field use in ageing nestling Black-crowned Night Herons, Plumed Egrets, and Little Egrets from measurements of tarsal and third primary wing feather lengths."

Norris, Robert A. (1918 Hahn Ave., Aiken, S. C.) COMPARATIVE BIOSYSTEMATICS AND LIFE HISTORY OF THE NUTHATCHES SITTA PYGMAEA AND SITTA PUSILLA. U. Calif. Publ. Zool. 56(2): 119-300, 13 figs. Sept. 1958. $3.50, paper, from U. Calif. Press, Berkeley & L. A.

Study of anatomy and taxonomy, and extensive field study of habits and behavior, lead Norris to conclude that the species are truly distinct and would not interbreed if their ranges came together.

Rivolier, Jean. POLAR REALM OF THE EMPERORS / ANTARCTICA'S EMPEROR PENGUINS BREED IN THE WINTER, AGAINST FRIGHTFUL ODDS. Nat. Hist. 68(2): 66-81, 14 photos. Feb. 1959.

Interesting popular account, excellently illustrated, of habits and life history of emperor penguins. The life of this bird is incredible, but apparently the harshness of the environment is proving too much, for the author reports that the species is steadily dwindling in numbers.

Sladen, Wm. J. L. THE PYGOSCELID PENGUINS. 1: METHODS OF STUDY. 2: THE ADÉLIE PENGUIN PYGOSCELIS ADELIAE (HOMBRON AND JACQUINOT). Falkland Islands Dependencies Survey, Sci. Reps. no. 17. i + 97 p. + 12 pl. 1958. 47s. 6d. net from H. M. Stationery Office, London. [From long review in Nature, Jan. 3, 1959.]

Detailed study of behavior, reproduction, and sociology. The long review in Nature summarizes many of the findings.

REPTILES AND AMPHIBIANS

Axtell, Ralph Wm. A MONOGRAPHIC REVISION OF THE IGUANID GENUS HOLBROOKIA. Ph.D. thesis, U. Tex. 260 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

Three species are recognized: H. lacerata (with 2 races), H. propinqua (2 races), and H. maculata (11 races). Synonmy, distribution, diagnosis, and relationships are discussed for each. Also included are sections on habits and habitat, osteology (H. lacerata), and a statistical study of variation in H. m. flavilenta.

Blair, W. Frank. (U. Texas, Austin.) MATING CALL AND STAGE OF SPECIATION OF TWO ALLOPATRIC POPULATIONS OF SPADEFOOTS (SCAPHIOPUS). Texas J. Sci. 10(4): 484-488. Dec. 1958.

S. holbrooki and S. hurteri were found to have essentially identical calls. Wasserman has shown that they are genetically compatible. Thus, although these forms are morphologically distinct, they probably would not behave as separate species if they crossed the soil-type barrier and came together geographically.

Bleakney, J. Sherman. (Natl. Mus. Can., Ottawa.) A ZOOGEOGRAPHICAL STUDY OF THE AMPHIBIANS AND REPTILES OF EASTERN CANADA. Natl. Mus. Canada Bul. no. 155. iii + 119 p., 49 + 5 maps, 1 diagram. 1958. $2.00, paper, from Queen's Printer, Ottawa.

The author collected in many parts of e. Canada from 1950 to 1956. He secured 6,000 specimens of 34 species and discovered numerous range extensions, some of them surprisingly great. The resulting distributional data are brought together here in the form of spot maps for each species. There are also long discussions of thermal and topographic features that limit ranges, postglacial distributional patterns, glacial refugia in s. U. S. from which different Canadian herptiles were derived, and the herpetofaunal areas of e. Canada. Much of this material seems good. The volume has no species accounts. The spot maps are confusing: what look like lines defining limits of known ranges actually show limits as outlined in some standard reference; there are a few to many spots beyond the lines, thus indicating the author's new records. If this device were needed, it would have been better to have taken the lines from such monographic studies as are available (Trapido, for example, rather than Schmidt & Davis for Storeria). This comment also applies to the small insert maps of entire ranges--which, though always referred to in the legends as species' ranges often are those of subspecies.

Cliburn, J. Wm. (Miss. S. Coll., Hattiesburg.) NOTES ON SOME SNAKES FROM MISSISSIPPI. Am. Midl. Nat. 60(1): 196-201. July 1958.

List of 42 species and subspecies, with data on localities and scale counts. Most specimens discussed are from Forrest Co., but many other counties are also represented in the collection reported on.

Coulter, Malcolm W. (U. Maine, Orono.) DISTRIBUTION, FOOD, AND WEIGHT OF THE SNAPPING TURTLE IN MAINE. Maine Field Nat. 14(3): 53-62, 1 map. July 1958.

The snapping turtle is common in e., s.-central and sw. Maine. It is rare or absent in n. and nw. part of state. Weights av. 17.7 lbs. but range up to 48 lbs. Males appear to attain weights twice as great as those of ♀♀. Vegetation makes up large part of diet, but mollusks, insects, and fishes are often eaten. Amphibians, birds, and mammals are taken when readily available. Peak of nesting is in June. In some years, eggs over-winter and hatch in next year.

Cunningham, John D. (Dept. Ed., U. Calif., Los Angeles 24.) REPRODUCTION AND FOOD OF SOME CALIFORNIA SNAKES. Herpetologica 15(1): 17-19. Feb. 1959.

Notes for 22 spp. and ssp.

Dawson, Wm. R., and George A. Bartholomew. (U. Mich., Ann Arbor.) METABOLIC AND CARDIAC RESPONSES TO TEMPERATURE IN THE LIZARD DIPSOSAURUS DORSALIS. Physiol. Zool. 31(2): 100-111. 1958. [From Biol. Abst. 33(1).]

See abst. in Biol. Abst. 33(1).

Delzell, David Edgar. SPATIAL MOVEMENT AND GROWTH OF HYLA CRUCIFER. Ph.D. thesis, U. Mich. 267 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]

Population study in se. Mich. using mark-and-release methods. Frogs transformed at 12.5 mm., were mature at 20 mm. in 2nd season, reached an av. of 25.8 mm. at end of 2nd season. After transformation, young frogs were terrestrial. They moved 4000 ft. at a rate of 20 to 130 ft. per day to enter the woodland population. Adults made a round trip of 1800 ft. to and from breeding ponds; ♂♂ established territories in the ponds, where some remained a month. Distances between territories seemed to be correlated with population size in relation to area. ♀♀ entered ponds only to breed and remained a day or two. After breeding, both sexes set up home ranges (4-18 ft. in diameter) in the woods, where they remained from June to Oct. Most movement in the range was concerned with feeding. Ranges of different individuals overlapped. Round trip excursions from the range occurred. Homing ability was strong. In fall, frogs moved into fields and other areas up to 1000 ft. from their summer ranges, but did not go into ponds until spring.

Dundee, Harold A. HABITAT SELECTION BY AQUATIC PLETHODONTID SALAMANDERS OF THE OZARKS, WITH STUDIES ON THEIR LIFE HISTORIES. Ph.D. thesis, U. Mich. 196 p. 1958. [From long abstract in Dissertation Abstracts 19(6).]
Ecological preferences and life history data for Eurycea tynerensis (neotenic), E. multiplicata, and Typhlotriton spelaeus (both occasionally neotenic) were determined by periodic field collections. Growth was analyzed by size-frequency histograms; food habits were studied by stomach-content analysis. Gametogenesis was prolonged in the euryceas and took place at different times of year in different populations. Courtship preceded oviposition by several months. Larval period required 2-3 years. The three species may occur in the same stream, but generally select different habitats; food habits overlap but competition is slight because of an abundance of food.

Fox, Wade, and Herbert C. Dessauer. (La. State U. Sch. Med., New Orleans 12.) RESPONSE OF THE MALE REPRODUCTIVE SYSTEM OF LIZARDS (ANOLIS CAROLINENSIS) TO UNNATURAL DAY-LENGTHS IN DIFFERENT SEASONS. Biol. Bul. 115(3): 421-439, 2 graphs. Dec. 1958.

Gandal, Charles P. (Zool. Park, N. Y. 60, N. Y.) A PRACTICAL METHOD OF OBTAINING BLOOD FROM ANESTHETIZED TURTLES BY MEANS OF CARDIAC PUNCTURE. Zoologica 43(3): 93-94, 1 fig. Nov. 1958.

Hensley, Max. (Mich. State U., E. Lansing.) ALBINISM IN NORTH AMERICAN AMPHIBIANS AND REPTILES. Mich. State U., Publ. of Mus., Biol. Ser. 1(4): 133-159. Jan. 1959. Single copy free on request.
Annotated list of all known albinistic specimens.

Inger, Robert F. (Chicago Nat. Hist. Mus., Ill.) TEMPERATURE RESPONSES AND ECOLOGICAL RELATIONS OF TWO BORNEAN LIZARDS. Ecology 40(1): 127-136, 4 figs. Jan. 1959.

Kikuchi, T. (Dept. Biol., Fac. Sci., Kyushu U., Fukuoka, Japan.) ON THE RESIDENTALITY OF A GREEN FROG, RANA NIGROMACULATA (HALLOWELL) (I). Japanese J. Ecol. 8(1): 20-26. 1958. [From Biol. Abst. 33(2).]
In Japanese with English summ. See abst. in Biol. Abst. 33(2).

Klimstra, W. D. (S. Ill. U., Carbondale.) FOOD HABITS OF THE YELLOW-BELLIED KING SNAKE IN SOUTHERN ILLINOIS. Herpetologica 15(1): 1-5, 1 graph. Feb. 1959.
Lampropeltis calligaster, probably the most abundant snake of the Mt. Vernon Hill Country of s. Ill., chiefly inhabits grassy areas. Its diet, as reflected by stomach contents of 124 specimens, reflects this habitat preference and also reflects food preferences and seasonal availability. Mammals were by far the main food, but a good many amphibians, reptiles, birds, and insects were also eaten. Feeding tapered off in late summer and fall despite availability of prey. Hunting was mostly by day. Blue racers occupy same habitat but feed more on insects and less on mammals, and are more arboreal.

Meyer, Delbert Eugene. STUDIES ON BACKGROUND COLOR SELECTION IN TWO SPECIES OF LIZARDS (HOLBROOKIA MACULATA SUBSPECIES AND PHRYNOSOMA MODESTUM). Ph.D. thesis, U. Wis. 92 p. 1958. [From abstract in Dissertation Abstracts 19(7).]
Laboratory studies of Holbrookia (from areas of graded soil colors and from White Sands Monument) and Phrynosoma (from center of its range) showed that both species strongly selected red sand as a background. Holbrookia preferred deep sand but showed strong secondary preference for red sand. White Sands lizards preferred the coarsest sand (20 mesh); ungraded sand was preferred to 40-mesh sand. When offered a temperature gradient of 8.1°C., lizards remained randomly distributed; when gradient was 1.9°C., they preferred the warmer sand. "It is suggested that if the behavior of the animals in the field is the same as shown by these experiments, then color mutations accompanied by changes in specific habitat selection cannot be responsible for the diversification of populations of these lizards into their asserted subspecies."

Milstead, Wm. W. (Texas Tech. Coll., Lubbock.) A LIST OF THE ARTHROPODS FOUND IN THE STOMACHS OF WHIPTAIL LIZARDS FROM FOUR STATIONS IN SOUTHWESTERN TEXAS. Texas J. Sci. 10(4): 443-446. Dec. 1958.
Report on stomach contents of 1141 individuals of 4 spp. of Cnemidophorus. Termites were chief food, and in general orthopterans were 2d, coleopterans 3d, and lepidopterans 4th. Apparently avoided were millipedes, lubber grasshoppers, and meloid beetles.

Richards, Christina Macgregor. (U. Ill., Urbana.) THE INHIBITION OF GROWTH IN CROWDED RANA PIPIENS TADPOLES. Physiol. Zool. 31(2): 138-151, illus. 1958. [From Biol. Abst. 33(1).]
See abst. in Biol. Abst. 33(1).

Sabath, Michael, and Richard Worthington. (3212 W. Dallas Ave., Houston, Texas.) EGGS AND YOUNG OF CERTAIN TEXAS REPTILES. Herpetologica 15(1): 31-32. Feb. 1959.
Notes for 4 sp. of lizards and 8 of snakes.

FISHES

Hubbs, Carl L., and Karl F. Lagler. (Scripps Inst. Oceanog. and U. Mich.) FISHES OF THE GREAT LAKES REGION. Cranbrook Inst. Sci. (Bloomfield Hills, Mich.), Bul. no. 26. 227 p., 45 color pl., 251 black & white illus. Revised ed. 1958. $5.00, cloth.
This famous and authoritative manual has been revised and expanded. "By keys and illustrations 234 species and races are identified. For each family there is a discussion of habits and, for game fishes, brief notes on angling methods."

INVERTEBRATES

Penn, George Henry, and Horton H. Hobbs. (Tulane U., New Orleans, La.) A CONTRIBUTION TOWARD A KNOWLEDGE OF THE CRAWFISHES OF TEXAS (DECAPODA, ASTACIDAE). Texas J. Sci. 10(4): 452-483, 68 figs. Dec. 1958.
This is really a preliminary manual of Texas crawfishes. It has keys, range maps, illustrations of characters, notes on ecology and life history.

Riegel, J. A. (U. Calif., Davis.) THE SYSTEMATICS AND DISTRIBUTION OF CRAYFISHES IN CALIFORNIA. Calif. Fish & Game 45(1): 29-50, 10 figs. Jan. 1959.

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